

October 2006

**Strategic action Proposal
AIR QUALITY WORK GROUP**

California Partnership for the San Joaquin Valley

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Air Quality Workgroup
Strategic Action Plan
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I. Vision Statement

The vision of the Air Quality Work Group is to enable residents to enjoy healthy air, removing the adverse impacts of poor air quality on health, quality of life and the economy.

II. Background

A. Scope Adopted by Partnership

- Evaluate, recommend and implement alternative paths to generate funding to invest in new research and technology to accelerate deployment of emission-reducing technologies.
- Evaluate, prioritize and recommend strategies to reduce emissions from on-road and off-road mobile sources.
- Evaluate, recommend and implement strategies to reduce emissions from stationary sources.
- Coordinate with the Land Use, Housing and Agriculture and Transportation Work Groups to evaluate, recommend and implement land use planning with a view to mitigate air quality impacts.
- Evaluate and recommend changes in governmental oversight to ensure a unified approach to implementation of recommended strategic plan.
- Explore and recommend strategies for widespread adoption of renewable energy and biofuels in the San Joaquin Valley to enhance ongoing air quality improvement strategies.
- Explore major transportation modes with respect to reducing air emissions (such as expanded rail service versus truck transportation for bulk commodities and products).

B. Overview

The San Joaquin Valley experiences some of the worst ozone and particulate air pollution in the nation.¹ Significant progress has been made in recent years, but the challenges ahead remain daunting.

¹ The San Joaquin Valley is one of only two air basins to have been classified by the EPA as “extreme” non-attainment for the federal (1-hour) ozone standard. The “extreme” classification no longer applies since the federal 1-hour ozone standard has been revoked across the nation and replaced by the more protective 8-hour standard. Under the new ozone standard, the San Joaquin Valley is classified as a “serious” non-attainment area with an attainment date of June 15, 2013. (See 69 FR 23858). The region may again be reclassified as “extreme” as a result of the new air quality planning process for the 8-hour standard.

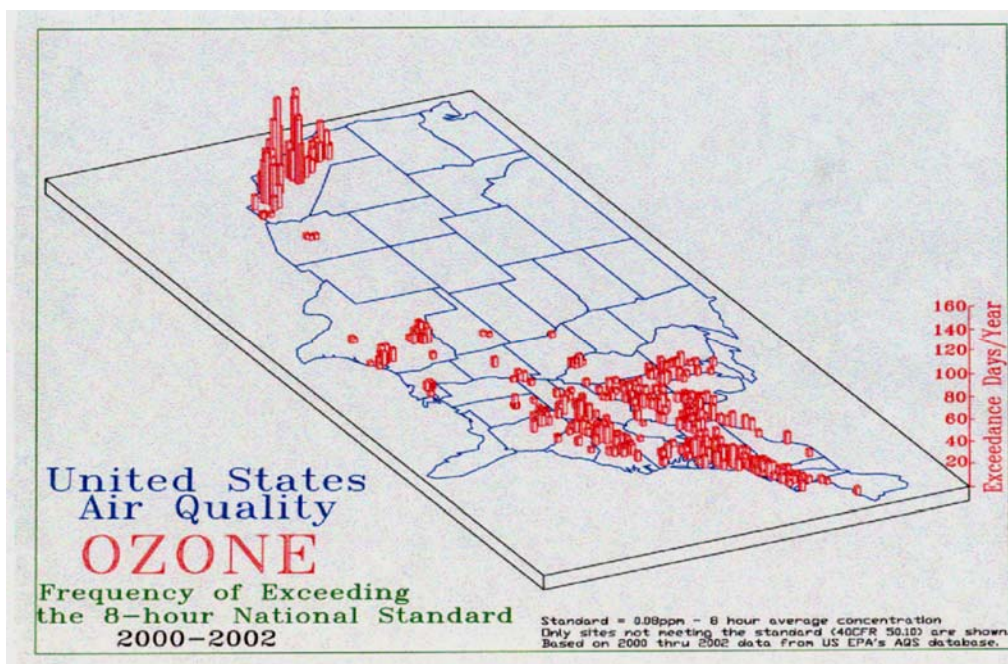


Figure 1: U.S. Ozone Violations 2000 – 2002

Source: Environmental Protection Agency

Significant progress has been made in recent years. The Valley has achieved compliance under the federal PM10 standard and the current 24-hour PM2.5 standard. Yet the challenges remain daunting. The Valley faces the twin challenges of attaining two federal air quality standards: the annual and revised 24-hour PM2.5 standard and the 8-hour ozone standard. Each of these standards has different federally mandated attainment deadlines. The San Joaquin Valley's current deadline to attain the federal 8-hour ozone standard is 2012, with the ability to "bump-up" to a later attainment year if necessary. The PM2.5 attainment deadline in the San Joaquin Valley is 2015. The PM2.5 deadline includes the single extension allowed by the federal Clean Air Act, so a further extension is not possible. It is important to note that attainment requires compliance for three consecutive years.

PM2.5 and ozone exposure both have substantial adverse health impacts, including serious respiratory impacts and premature death. The link between premature death and PM2.5 exposure is well documented. The Valley has one of the highest rates of respiratory ailments² and mortality rates attributable to air pollution in the nation,³ putting a strain on the Valley's already stretched health care system. An April 2006 report card from the American Lung Association ranks Bakersfield as the most ozone-polluted city in the country, with Visalia-Porterville in third place, Fresno-Madera ranked fourth and Merced ranked fifth.

The Valley's poor air quality also has an adverse effect on economic growth. Health impacts, attributable lost work days and school day absences limit the number of employers that wish to locate in the Valley and affect retention and attraction of the knowledge workers so critical to

² American Academy of Allergy, Asthma and Immunology.

³ "Top 50 MSAs Ranked by Attributable Mortality Rate," Natural Resources Defense Council.

improved economic competitiveness.⁴ A recent report puts the cost of non-attainment at more than \$3 billion per year or, on average, \$1,000 per Valley resident per year.⁵ These health and economic impacts make it essential to reduce public exposure to the pollutants as quickly as possible. Further, failing to attain either of the above-mentioned standards by the mandated deadlines will result in federal sanctions.

Since 1990 the San Joaquin Valley has reduced the ozone precursors in the air by approximately 40%. Industrial sources of pollution have reduced their emissions by over 50%. These efforts have resulted in approximately a 90% reduction in the number of days above the federal 1-hour ozone standard. The fact that these large reductions have not resulted in a significant drop in the number of “exceedances” of the 8-hour standard is indicative of how challenging the standard will be to meet in the San Joaquin Valley.

The air pollution problems of the Valley are attributable in part to a more limited air pollution “carrying capacity” than that of any other major air basin in the country. “Carrying capacity” is not a legally defined term, but rather a way of describing differences in regional vulnerability to air emissions from one air basin to another. The San Joaquin Valley’s geography, topography and climate conditions cause the Valley to experience low air evacuation and dispersion rates and frequent inversions. These conditions accelerate and intensify precursor conversion to ozone and PM2.5. In simple terms, a low level of emissions in this region can create a serious air pollution problem. To state it another way, every unit of emissions in this region creates a disproportionate pollution impact. For example, in 2005 the California Bay Area emitted approximately 5 times the ozone precursor loads of the San Joaquin Valley per square mile, yet had far fewer ozone violations. The South Coast had an ozone precursor emissions density approximately 7 times greater than the San Joaquin Valley, yet the Valley and the South Coast experienced a similar number of 8-hour ozone violations.

⁴ Based on anecdotal data collected by the Fresno Regional Jobs Initiative.

⁵ Hall, Jane V. et al, *The Health and Related Economic Benefits of Attaining Healthful Air in the San Joaquin Valley*, California State University, Fullerton Institute for Economic and Environmental Studies, 2006.

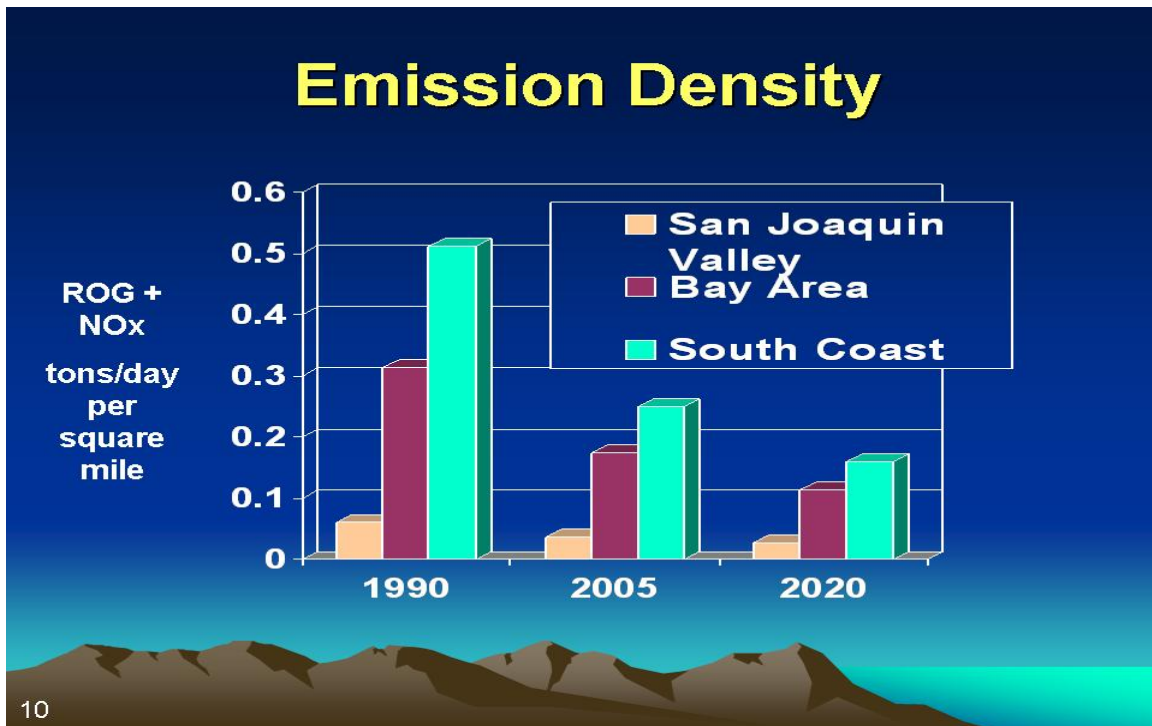


Figure 2. Comparative Emission Densities

Source: San Joaquin Air Pollution Control District

Topography and climate also contribute to poor air quality in the world-class national parks that lie in the Sierra Nevada east of the Valley. Sequoia and Kings Canyon National Parks, both designated Class I airsheds under the Federal Clean Air Act, experience some of the worst air quality in any national park in the country, largely as a result of pollutants originating outside the park boundaries.

The scope of reductions needed to achieve EPA standards by the earliest attainment deadlines is dramatic. Fortunately, many of the sources of emissions contributing to elevated PM_{2.5} and ozone are the same. In particular, reductions of nitrogen oxides (NO_x) from mobile sources are critical to meeting both the PM_{2.5} and ozone standards.

The good news is that large emissions reductions will occur through the ongoing implementation of regulations already adopted by the California Air Resources Board (ARB) and the San Joaquin Valley Air Pollution Control District. Through the combination of local controls and California's mobile source control program, NO_x and ROG emissions reductions on the order of 200 tons per day are expected in the San Joaquin Valley in 2012, from nearly 1,000 tons/day to approximately 750 tons/day. The bad news is that additional reductions on the order of 400 tons per day will be required for attainment of 2012 standards, requiring actions that go well beyond existing controls and programs.

The California Partnership for the San Joaquin Valley's Air Quality Work Group has held monthly meetings since October 2005 and has also held brainstorming sessions at public forums throughout the Valley to identify key solutions to the challenge. The Work Group recognizes that the Valley's air quality challenges do not lend themselves to "silver bullet" solutions. No

one category of emissions sources is responsible for the Valley's air quality problems. To provide perspective, mobile sources are the biggest ozone contributor to the Valley's pollution, but prohibition of *all truck and passenger vehicle traffic* in the Valley – hardly a practical alternative – would be insufficient to achieve 8-hr. ozone attainment by 2012. A viable plan relies on emissions reductions from all sectors. In addition, it will take a combination of regulatory and incentive measures to bring clean air to the Valley.

As important as it is to take short term actions to try to attain EPA standards by 2012 and 2015, it is equally important to spur longer term actions that will provide sustainable air quality improvements for the Valley, including land use planning that factors in air quality impacts, and increased use of renewable energy, alternative fuels and mass transit. These actions will not only beneficially affect health but will also positively affect the regional economy by reducing diversion of financial resources for air quality mitigation and improving the utilization of regional assets. Biomass that is burned or land-filled is not only a significant contribution to poor air quality; it is a waste of valuable resources.

The ARB and the District are in the process of developing a State Implementation Plan (SIP) for the Valley, which is required to show how the region will attain the standards. To complement the SIP, the Partnership has identified constraints to the attainment of these standards and is proposing actions to minimize or eliminate these constraints as well as strategic actions that will maximize near-term health benefits and assist in the development of a long-term sustainable air quality environment that affords Valley residents the opportunity to enjoy health standards comparable to the norm for other U.S. residents.

C. Sources of Pollutants

Ground level ozone results from a photochemical reaction between Oxides of Nitrogen (NO_x) and Reactive Organic Gases (ROG). This reaction is accelerated by heat, so ozone pollution is typically worse on hot, sunny days. The environment of the San Joaquin Valley is ideal for ozone formation.

EPA/ARB vehicle emissions control and fuel standards, stationary and area regulations introduced by the District, and collaborative efforts between industry and the Air District, have combined to yield positive trend lines. As shown in the chart below, most sources of ozone pollution are projected to diminish as a result of controls and incentive mechanisms that are already in place. However, the challenges for the Valley remain enormous.

Chart 1

Table 4 Top 25 Emissions Inventory Categories for NOx (in tons per day, based on preliminary estimates)			Table 5 Top 25 Emissions Inventory Categories for VOC (in tons per day, based on preliminary estimates)		
Source Category	2005	2015	Source Category	2005	2015
Heavy duty diesel trucks	225.3	116.7	Livestock waste (dairy cattle)	39.4	52.4
Manufacturing and industrial (boilers, IC engines)	32.2	37.7	Light duty passenger cars	69.4	38.1
Light duty passenger cars	65.0	30.8	Consumer products	23.3	27.1
Farm equipment (tractors)	50.6	28.1	Oil and gas production (evaporative losses)	27.9	25.2
Trains	23.6	20.8	Pesticides	24.0	22.3
Off-road equipment (construction and mining)	36.5	16.1	Prescribed burning	20.7	20.0
Off-road equipment (other)	18.9	12.3	Off-road recreational vehicles	15.9	16.2
Agricultural irrigation pumps	16.6	12.3	Coatings (paints and thinners – non architectural)	12.1	16.0
Oil and gas production (combustion)	11.2	9.7	Recreational boats	16.1	12.7
Glass and related products	9.4	9.3	Petroleum Marketing (gasoline evaporative losses)	10.8	12.6
Food and agriculture (crop processing and wineries)	9.2	8.9	Food and agriculture (crop processing and wineries)	11.4	12.3
Service and commercial (boilers, IC engines)	7.7	8.1	Architectural coatings (paints and thinners)	9.4	10.3
Heavy duty gas trucks	10.0	7.8	Livestock waste (broilers)	8.4	8.4
Co-generation (electricity generation and heat recovery)	10.0	7.5	Heavy duty trucks	12.7	8.2
Residential fuel combustion	6.3	5.8	Ag burning	8.4	8.2
Ag burning	4.0	3.9	Heavy duty diesel trucks	13.5	8.0
Recreational boats	3.9	3.4	Livestock waste (range cattle)	7.3	7.3
Electric utilities	3.3	3.2	Aircraft	6.4	6.7
Mineral processes (mining, cement manufacturing)	2.3	2.8	Livestock waste (feedlot cattle)	5.0	5.0
Air craft	2.3	2.4	Other (cleaning and surface coatings)	3.4	4.5
Heavy duty urban buses	2.4	2.3	Motorcycles	5.5	4.4
School buses	2.1	2.2	Residential Fuel Combustion	5.9	4.2
Prescribed burning	1.8	1.8	Off-road equipment (lawn and garden)	5.9	4.1
Ships and commercial boats	1.2	1.3	Adhesives and Sealants	3.2	3.8
Motorcycles	1.3	1.3	Farm equipment (tractors)	6.9	3.3

1. Ozone

Oxides of Nitrogen (NOx)

As shown below, mobile sources contribute 79% of the NOx in the Valley. Of the on-road mobile sources, the largest single contributor is diesel trucks. They represent only 2 to 4% of on-road vehicles, but contribute over 74% of NOx and over 74% of particulate matter from on-road mobile sources. Much of this truck traffic is from goods movement on Highway 99 and

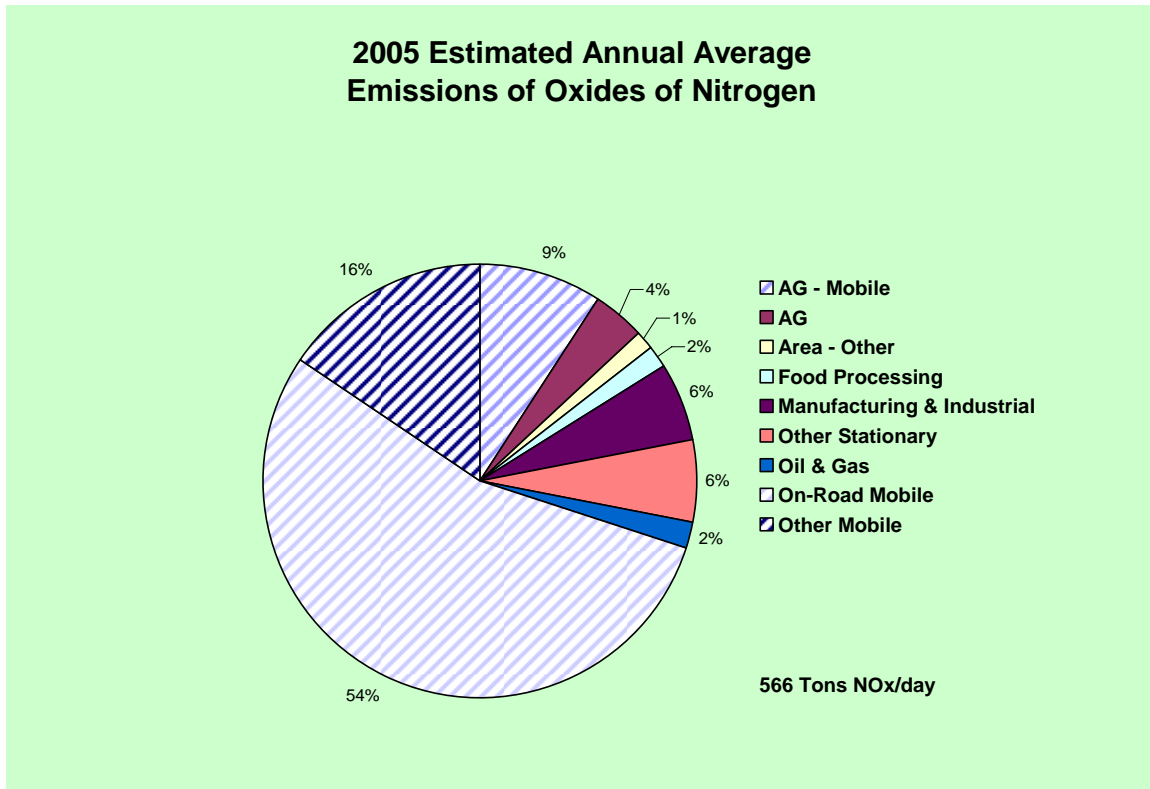


Chart 2. 2005 Estimated Annual Average Emissions of Oxides of Nitrogen

Source: California Air Resources Board – O3 SIP v1.03 Emissions Inventory

Interstate 5, some from trucks using these as pass-through corridors, leaving behind exhaust emissions while making virtually no contribution to the Valley economy (22% of trucks were last fueled outside of California).⁶ Studies also indicate that 80% of all diesel engines in California are over ten years old.⁷

The second most important source of “on-road mobile” pollution is light passenger vehicles referred to as “gross polluters,” old or poorly maintained cars that represent about 10% of all light passenger vehicles but contribute an estimated 35-50% of the pollution from that category.⁸

Off-road vehicles, including farm equipment, construction equipment and locomotives, contribute more than a quarter of all NOx in the Valley.

Reactive Organic Gases (ROG)

As shown below in Chart 2, mobile sources also account for the largest share (40%) of ROG, followed by agriculture (20%) and dairy (10%).⁹ It should be noted that the District has limited jurisdiction today over mobile sources and has only recently been given jurisdiction over agricultural and dairy emissions.

⁶ Council of Fresno County Governments

⁷ Ibid.

⁸ Ibid.

⁹ Agricultural mobile emissions are included in total Mobile Sources as well as in total AG emissions.

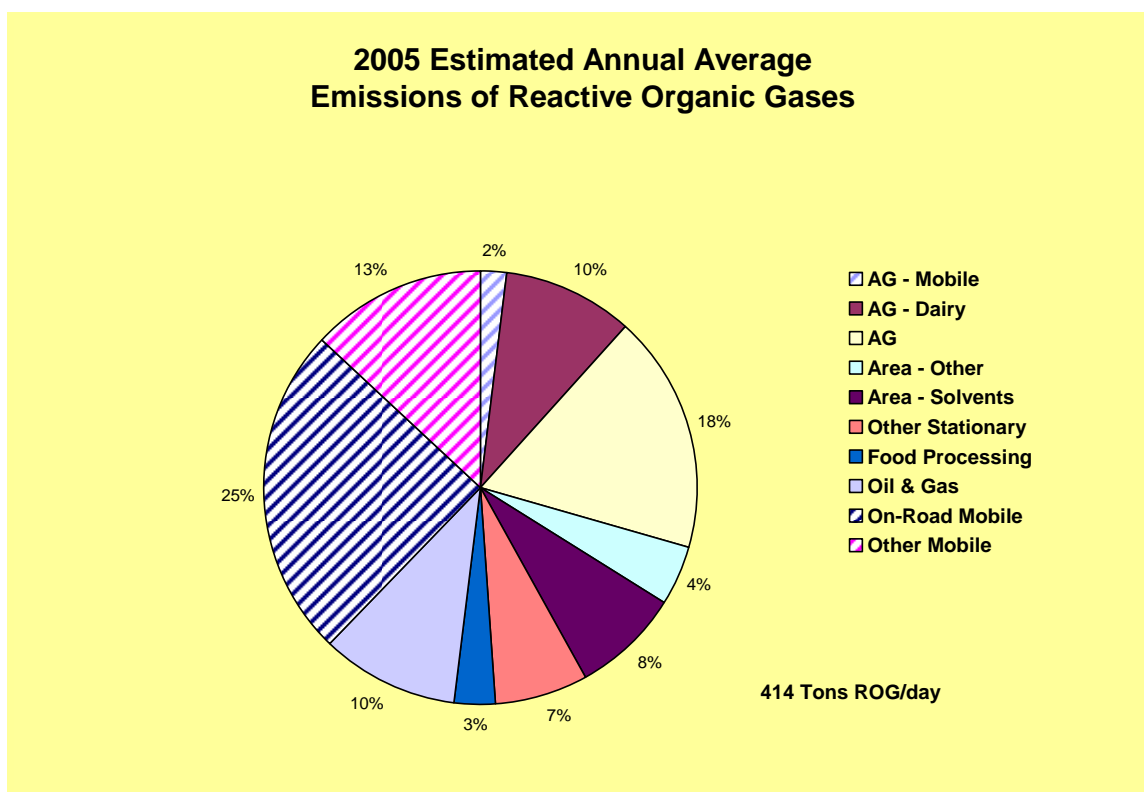


Chart 3. 2005 Estimated Annual Average Emissions of reactive Organic Gases
Source: California Air Resources Board – O3 SIP v1.03 Emissions Inventory

2. Particulate Matter

Particulate Matter (PM), aerosols or fine particles are tiny particles of solid or liquid suspended in a gas. They range in size from a gathering of a few molecules to the size where the particles no longer can be carried by the gas.

The effects of inhaling particulate matter have been widely studied in humans and animals and include asthma, lung cancer, cardiovascular issues, and premature death. The size of the particle determines where in the body the particle will come to rest if inhaled. Larger particles are generally filtered by small hairs in the nose and throat and do not cause problems, but particulate matter smaller than about 10 micrometers, referred to as PM₁₀, can settle in the lungs and cause health problems. Particles smaller than 2.5 micrometers, PM_{2.5}, can penetrate directly into the lung, whereas particles smaller than 1 micrometer, PM₁, can penetrate into the alveolar region of the lung and tend to be the most hazardous when inhaled. In particular, a study published in the *Journal of the American Medical Association* indicates that PM_{2.5} leads to high plaque deposits in arteries, causing vascular inflammation and atherosclerosis – a hardening of the arteries that reduces elasticity, which can lead to heart attacks and other cardiovascular problems.¹⁰ Researchers suggest that even short-term exposure at elevated concentrations could significantly contribute to heart disease.

¹⁰ Pope, C Arden, et. al, "Cancer, cardiopulmonary mortality, and long-term exposure to fine particulate air pollution," *Journal of the American Medical Association* no. 287 (2002): 1132-1141.

PM 10

PM 10 refers to particulate matter that is 10 microns or less in diameter but typically does not refer to particulate matter less than 2.5 microns in size, hence a second standard for fine particulate matter under the PM 2.5 category. The main causes of PM 10 pollution in the San Joaquin Valley are dust from roads, parking lots, construction, mining, bulk material storage, and other activities. While the District has attained the federal PM standard, continued work will be required to remain in attainment as the Valley grows.

PM 2.5

PM 2.5 typically exists in a variety of forms. One form, called secondary particulate matter, occurs when two pollutants, usually including oxides of nitrogen, combine in the air. Another form, called primary particulate matter, enters the air as an existing pollutant.

D. Health Risks

Residents of the San Joaquin Valley rank among the highest 5% in the nation for pollution-related health risks and the implications are profound. Valley residents regularly suffer asthma attacks, acute bronchitis, lost work days, reduced activity, hospital admissions, school absences, and even premature death because of exposure to air pollution.¹¹

One in six Valley residents has been diagnosed with asthma.¹² In a health survey conducted by the UCLA Center for Health Policy Research, of 198,000 respondents from the Valley with asthma 91% experienced symptoms and 18% sought asthma emergency care within the 12 months prior to their interview.¹³

San Joaquin Valley youth experience asthma complications more than children across California and across the nation.¹⁴ Youth who grow up in smoggy areas have lungs that are underdeveloped by the age of 18 and will likely never recover.¹⁵ Teenagers that live in more polluted areas are five times as likely to have clinically low lung function than teens living in low-pollution areas.¹⁶ Each year, asthma accounts for 808,000 days of Valley school absences.¹⁷

One of the most dangerous forms of primary particulate matter is PM 2.5 produced by diesel engines. The state of California classifies diesel soot as a toxic air contaminant and ARB estimates that diesel soot from mobile (on-road and off-road) and stationary sources is responsible for about 70% of the cancer risk associated with air pollution. ARB has adopted a diesel risk reduction program which includes regulations that will come into effect to encourage retrofits and replacements of the dirtiest diesel engines.

¹¹ Hall.

¹² 2003 California Health Interview Survey, UCLA Center for Health Policy Research, www.askchis.org.

¹³ Ibid.

¹⁴ Ibid.

¹⁵ Gauderman, James W. et al, "The Effect of Air Pollution on Lung Development from 10 to 18 Years of Age," *New England Journal of Medicine* 11, no. 351 (2004): 1057-1067.

¹⁶ Ibid.

¹⁷ Hernandez, Virginia Rondero et al, *Struggling to Breathe: The Epidemic of Asthma Among Children and Adolescence in the San Joaquin Valley*, Central California Children's Institute, 2004.

As PM 2.5 pollution levels increase, the risk of fatty deposits that thicken artery walls (arteriosclerosis) also increases.¹⁸ Arteriosclerosis is associated with a higher risk of heart attack and stroke. Ozone exposure is correlated to reductions in lung function, shortness of breath, wheezing, coughing, and asthma exacerbations.¹⁹

Recent research and regulatory activity at the federal level points to new concerns about PM 2.5 hotspots. These hotspots typically include roadways and places where many vehicles, especially diesel vehicles, congregate. Research shows that people living and working close to these areas are at higher risk for a range of lung and heart ailments. Residential distance to a freeway is directly linked to higher NOx concentrations, wheezing, and use of asthma medications.²⁰

E. The Regulatory Environment

The structure for regulating air quality in the San Joaquin Valley consists of three levels: Federal (EPA), State (ARB) and local (District). While simply structured the regulatory authority across and within the three levels is complicated. In general, the jurisdictional authority for regulating air pollution in the San Joaquin Valley depends on where the pollution occurs and from which type of source (stationary, area, or mobile) the air pollution is released. The federal Clean Air Act (CAA) is enforced by the Environmental Protection Agency (EPA). In addition to overseeing state and local agency implementation of the requirements of the CAA, the EPA regulates the manufacture and use of mobile sources in conjunction with the California Air Resources Board (ARB). ARB is also responsible for the California Air Pollution Control Laws, including the California Clean Air Act.²¹ This includes responsibility for monitoring the regulatory activity of California's 35 local air districts, including the San Joaquin Valley Air Pollution Control District (SJVAPCD or District), which is responsible for promulgating rules and regulations for stationary sources in the San Joaquin Valley.

The SJVAPCD has limited authority to regulate the dominant source of air pollution -- mobile sources (representing 79% of NOx and 40% of ROG pollution). Control of direct tailpipe emissions from mobile sources is under the jurisdiction of the federal EPA and CARB. Until SB 700 was passed by the California legislature in 2004, ending California's agricultural exemption to the Clean Air Act's permitting requirements, the District had no jurisdiction over agricultural sources of air pollution. Its role was limited to only stationary and area sources, non-agricultural emissions, which represent less than 30% of all emissions sources.

F. Issues

1. Health Risks

Residents of the San Joaquin Valley rank among the highest 5% in the nation for pollution-related health risks (see *Health Risks* section II.D.).

¹⁸ Mack, Wendy J. et al, "Ambient Air Pollution and Sub clinical Atherosclerosis," *American Heart Association Scientific Sessions*, Abstract Oral Sessions AOP.29.3a, 2004.

¹⁹ Thurston, George D. and David V. Bates, "Air Pollution as an Underappreciated Cause of Asthma Symptoms," *Journal of the American Medical Association* 14, no. 290 (2003): 1915-1917.

²⁰ Guaderman, W.J. et al, "Childhood asthma and exposure to traffic and nitrogen dioxide," *Epidemiology* 16, no. 6 (2005): 737-743.

²¹ See <http://www.arb.ca.gov/html/lawsregs.htm>.

2. Failure to demonstrate attainment of the federal 8-hour ozone standard

The District must develop a State Implementation Plan (SIP) with the help of the ARB that shows how the Valley will meet the federal 8-hour ozone standard by its attainment date. Currently, the Valley is classified “Serious” for 8-hour ozone, and has a June 15, 2013 attainment date (effectively 2012). Meeting the health protective 8-hour ozone standard by 2012 is expected to be extremely challenging and will require major emissions reductions. The Clean Air Act provides non-attainment areas the opportunity to request a higher classification, with a later attainment date, but that comes at a cost of more stringent permitting standards and a deferral of the date when Valley residents can achieve health standards comparable to the norm for U.S. citizens.

The CAA provides for significant penalties for failure to submit attainment plans, submission of unapprovable plans, or failure to meet planned emissions reductions. These penalties include permitting sanctions and loss of federal transportation funding²² As a last resort, U.S. EPA must prepare a Federal Implementation Plan (FIP) to provide for attainment, resulting in loss of local control.

3. Mobile Sources

Mobile sources, particularly diesel engines and gross polluting gasoline vehicles, are by far the largest contributor to the problem, representing about 79% of NO_x and 40% of ROG.

4. Limited carrying capacity for pollution

The geography and climate of the Valley cause exceedances of air quality standards at much lower pollution densities than in other air basins, placing a higher burden on Valley residents, businesses and local governments than in other air basins.

5. Rapid growth compounds the problem

The U.S. Census Bureau projects that the population growth rate for the San Joaquin Valley through 2030 will be 65% higher than the average for the State of California. Absorption of that population growth and economic growth in a region that is already *grossly exceeding its carrying capacity for air pollution* is a major challenge for the Valley.

6. Economic impact

The federal Clean Air Act is aimed exclusively at the achievement of health standards that apply equally to all U.S. residents, irrespective of their place of residence. It does not consider the economic consequences of applying those standards equally to regions with distinctly different pollution carrying capacities. Its premise is that U.S. residents should not have to make health compromises when they choose their place of residence.

The limited pollution carrying capacity of the Valley places it in the proverbial place between a rock and a hard place. On one side, the higher cost of more stringent and expensive pollution mitigation measures than are required in most other U.S. air basins contribute adverse economic

²² Loss of federal transportation funding is estimated by the Fresno Council of Governments at \$250 million per year plus the value of earmarks, which at the time of this writing amount to \$750 million for Kern County alone.

impacts for local government, reduced competitiveness for local industry, adverse impacts on job creation, resultant unemployment, high poverty levels, and the poor health generally associated with high poverty.

On the other hand, non-attainment of the mandated 2013 standards is estimated to cost more than \$3 billion per year or, on average, \$1,000 per Valley resident per year.²³ These costs represent 460 premature deaths among those age 30 and older; 23,300 asthma attacks; 188,000 days of school absences; 3,230 cases of acute bronchitis in children; 3,000 lost work days; 325 new cases of chronic bronchitis; 188,400 days of reduced activity in adults; 260 hospital admissions; and more than 17,000 days of respiratory symptoms in children.²⁴ School absences from asthma alone cost San Joaquin Valley school districts \$26 million annually.²⁵

7. Affordability gap

Technology is available to make step-function improvements in air quality. The issue is affordability. Without additional incentives to encourage early adoption of practices and technologies that reduce pollution, or incentives to help regulated industries go above and beyond their pollution reduction requirements, the Valley's residents won't get the health protections the Clean Air Act intended as quickly as needed.

8. Lack of clear accountability

Valley residents want to know what the plan is to clean the Valley's air and where the buck stops. Most believe responsibility lies with the District, which in fact has limited control over the largest source of pollution – mobile sources -- which are largely under the jurisdiction of ARB and the EPA. Even if the complex issue of diffuse responsibility and accountability is set aside, there is no place where Valley residents can go to obtain a lay description of the Valley's plan to address all pollution sources nor to measure progress against that plan.

G. Constraints

1. Institutional

The San Joaquin Valley's efforts to attain the new federal 8-hour ozone and PM2.5 standards occur after many years of emissions controls. A number of sources have been controlled multiple times and are producing emissions substantially lower than they were 20 years ago. This past success makes obtaining significant additional emissions reduction more challenging since most of the large, relatively cost-effective emissions reductions have already been achieved. In order to overcome the law of diminishing returns, new and innovative approaches need to be implemented to control emissions. In some cases, these innovative approaches have been constrained by institutional requirements that were developed when opportunities for traditional emissions reductions were abundant. In order for the San Joaquin Valley to achieve the new standards all approaches need to be maximized, including command and control regulations, alternative compliance programs, incentive based programs, as well as significant controls on state and federal sources.

²³ Hall.

²⁴ Hall.

²⁵ Hernandez.

It is important that this effort be approached as a partnership between the U.S. EPA, the ARB and the District. These organizations are jointly responsible for attainment of air quality standards in the San Joaquin Valley. The system is set up so that these agencies have a regulatory and compliance role at the same time that they have a joint obligation to develop and implement plans that produce the desired outcomes. When they fail to do so, the price of failure is paid by local residents in the form of protracted adverse health standards and adverse economic impacts. It is recognized that the more removed an agency is from a specific air basin, the more impractical it is for the agency to define regulations that are specific to that air basin. This is true of the ARB, which has 35 air basins under its jurisdiction, and even more true of U.S. EPA, which has jurisdiction over all air basins in the country. Regulations, understandably, are issued to apply to the norm. When an air basin like the San Joaquin Valley, because of its challenging climate and geography, falls as far outside the norm as it does, it is important that the agencies support incentive programs that take these peculiarities into consideration.

a. Alternative Compliance Strategies

In cases where sources have been substantially controlled through multiple iterations of command and control emissions controls, additional emissions reductions through traditional regulation is relatively expensive and will produce small emissions reductions. In these situations, alternative compliance strategies provide a viable means of achieving cost-effective emissions reductions. In general, alternative compliance approaches establish an emissions goal for a source to achieve and allow the source to control specified equipment, control other on-site equipment, or achieve off-site emissions reductions. This approach allows the source to seek the most cost-effective emissions reductions rather than controlling a specific piece of equipment regardless of cost. The EPA has established guidance that places significant constraints on alternative compliance programs. These constraints have severely limited the ability of local agencies to implement alternative compliance programs. In order to achieve the emissions reductions required to meet the new federal air quality standards, the San Joaquin Valley will likely need to implement alternative compliance programs. If these programs are to achieve their maximum potential emissions reduction, unnecessary institutional impediments need to be removed.

b. Incentive Programs

The utilization of incentive programs to achieve emissions reductions from sources that are not easily controlled through command and control regulations has grown substantially in recent years. The District has allocated over \$110 million to achieve emissions reductions through voluntary incentive programs since its inception. Recently, the Carl Moyer program has received significant on-going funding from the State of California. In order for the Valley to attain the new air quality standards, incentive programs will need to be expanded further. There are a number of state and federal policies in place that appear to limit the expansion of incentive programs.

Currently, the Carl Moyer program is the largest incentive program in the State of California. ARB establishes guidelines for the utilization of Carl Moyer funds. As directed by State law, the Carl Moyer Program Guidelines are designed to ensure that Moyer Program funds are not used to pay for reductions already required by State or

federal law. In order to ensure that the emissions reductions achieved are beyond those due to regulation alone, the Carl Moyer Guidelines have made assumptions about the emissions reductions available from projects. Sometimes, these assumptions limit the projects that are eligible for funding through the program. For example, the fleet modernization program is limited to pre-1990 on-road vehicles only. Identifying the optimum funding and eligibility criteria for the San Joaquin Valley is an important consideration in designing expanded incentive programs if the Carl Moyer and other programs are to fully realize their potential.

Additionally, the ability to take credit for emissions reductions achieved through incentive programs is vital to their expanded use. Currently, EPA policies limit the amount of credit that can be taken for Voluntary Emissions Reduction Programs. When this policy was established, it was designed for programs with emissions reductions that relied on voluntary action with limited enforcement mechanisms (i.e. voluntary trip reduction programs, land-use programs, and bicycle and pedestrian programs).

The EPA, ARB, and the District are currently working to develop a viable approach to credit incentive programs as part of the SIP. A successful resolution to this issue is critical to the potential expansion of incentive programs.

It bears repeating that it is vitally important that the District, ARB and EPA work in partnership to effectively discharge their collective responsibility for attainment of health standards in the Valley. Where new and anticipated regulations are not enough to achieve attainment, it is important that these agencies identify how incentive programs can help provide the necessary emissions reductions.

2. Timeline for Implementation of Federal Controls

Heavy-duty on-road and off-road mobile sources are one of the largest contributors to the Valley's pollution problems. In most instances EPA has the sole authority to control these sources. While the EPA has adopted requirements on new engines, and in some instances has required that rebuilt equipment be upgraded with new emissions control technology, the emissions reductions from these requirements will occur over a number of years and will not be fully realized until after the Valley's attainment deadlines. If the Valley is to attain the Federal Standards under the existing timeframes, the penetration of these requirements to the existing fleet will need to be accelerated.

a. Heavy-Duty Vehicles

The EPA is responsible for developing controls on new heavy-duty diesel engines that are utilized in on-road vehicles. Controls for heavy-duty on-road engines have not achieved emissions reductions comparable to controls that have been placed on light-duty passenger vehicles. The EPA has adopted progressively more stringent standards that phase in through 2010. While the full benefit from these requirements will be realized in the future as the existing fleet is replaced, they will not materially help attain 2013 EPA standards. The San Joaquin Valley will still have a significant number of relatively high emitting vehicles long into the future since these vehicles have a relatively long service life.

ARB has begun to develop in-use vehicle requirements that require vehicles to be retrofitted and/or re-powered in order to reduce emissions. In-use requirements currently exist for urban-transit vehicles and refuse vehicles. In many cases, for on-road trucking vehicles, the cost of retrofit or re-powering vehicles will be substantially more than the vehicles are worth. This is particularly true for San Joaquin Valley farm to market fleets that are older than the statewide average, are operated by relatively small operators, and do not travel the number of miles that larger goods movement fleet vehicles travel. In many cases, substantial emissions reductions can be achieved by scrapping these existing vehicles and replacing them with newer vehicles that meet lower emissions standards. These programs are commonly referred to as fleet modernization programs. As mentioned previously, only pre-1990 vehicles are currently eligible for funding through the Carl Moyer fleet modernization program. Currently, ARB is re-evaluating the fleet eligibility criteria based on recently available in-use truck emissions rate data. Identifying program criteria for fleets in the Valley is critical to running a successful fleet modernization program in the San Joaquin Valley.

b. Off-Road Diesel Engine Standards

Off-road equipment is regulated by ARB and EPA. The EPA has the sole authority to regulate emissions from engines less than 175 horsepower. ARB has the authority to regulate engines between 175 and 750 horsepower. Off-road equipment between 175 and 750 horsepower were uncontrolled prior to 1996. Estimates of NO_x emissions rates from uncontrolled off-road engines range from 8.2 g/bhp-hr to 14 g/bhp-hr. In January 1992, the ARB adopted exhaust emissions standards for off-road diesel-cycle engines 175 hp and greater, effective beginning with 1996 model year engines.

In August 1996, EPA, ARB and off-road diesel engine manufacturers signed a Statement of Principles which called for harmonization of ARB and U.S. EPA off-road diesel engine regulations, as appropriate, in exchange for an accelerated introduction of progressively more stringent standards. The U.S. EPA adopted emissions standards in 1998 and again in 2004 that provided for new NO_x + non-methane hydrocarbons (NMHC), PM, and carbon monoxide (CO) emissions standards for engines within different power categories in a tiered approach, commonly referred to as “Tier” standards. These standards are defined in Title 13, California Code of Regulations (CCR), section 2423(b) (1). ARB has since amended the California exhaust emissions standards for off-road diesel engines to harmonize with the federal requirements.

While the tiered emissions standards will provide significant emissions reductions from new equipment, emissions from existing equipment will continue long into the future. Specifically, the San Joaquin Valley has a significant amount of agricultural off-road equipment. This equipment has a particularly long service life and will continue operating well past the Valley’s attainment deadlines. Currently, the Carl Moyer program only allows existing equipment to be re-powered with a newer cleaner engine or retrofitted with an after-treatment device. The Carl Moyer program does not currently allow for a scrap and replace (fleet modernization) program for off-road mobile equipment. In many cases, older off-road equipment can not be re-powered with a new

engine, and retrofit devices are only verified for specific engine families. Additionally, the cost of re-powering or retrofitting this equipment is often substantially more than the equipment is worth. Designing an incentive program with criteria through which older off-road equipment can be replaced, when that is the cost effective option, will allow for more rapid emissions reductions from this equipment.

c. Locomotives

While shipping freight via rail is a relatively efficient and lower emissions method of goods movement on a ton-mile basis, the emissions level from each locomotive is relatively high compared with heavy-duty truck engines. The U.S. EPA has the sole authority to set emissions standards for new and remanufactured locomotives and has adopted phased-in locomotive emissions standards [Federal Register, April 16, 1998]. Federal locomotive emissions standards contain two primary provisions: 1) remanufacture emissions limits applicable to railroads whenever they remanufacture or rebuild their locomotive engines, and 2) emissions standards for new locomotives applicable to locomotive manufacturers. In the San Joaquin Valley, EPA requirements only apply to UP, BNSF, and AMTRAK. Smaller rail carriers are exempt from the EPA requirements.

Regulation of remanufactured locomotives is critical because locomotives are generally remanufactured five to ten times during their service lives. U.S. EPA's locomotive remanufacture emissions standards therefore provide a mechanism to reduce emissions from the existing fleet. Federal locomotive remanufacture emissions standards require locomotives originally manufactured in 1973 or later to meet the emissions limits whenever they are rebuilt or remanufactured. Locomotives originally manufactured before 1973 are exempt from the federal locomotive remanufacture requirements.

In May 2004, U.S. EPA issued an Advanced Notice of Proposed Rulemaking, signaling its intent to pursue more stringent standards for new and existing locomotives [U.S. EPA, 2004]. The standards are likely to be modeled after 2007 and 2010 on-road and off-road diesel engine standards, and to be based on the application of catalytic after-treatment technology. The new locomotive standards are unfortunately not likely to be phased in until 2015. While the benefit from these standards will be realized in the future, they will not materially help attain 2013 EPA standards. It is imperative to the Valley that the EPA achieve the largest possible emissions reductions from sources under its control to assist in meeting the federal air quality standards.

3. Capacity

One of the constraints of any market based system is the availability of equipment and the ability to get that equipment into use. Some constraining factors are manufacturing capacity, market demand elsewhere around the county and the world, and the capacity of the sales and distribution system. For example, it might be desirable in the course of the year 2012 to convert all pre-2011 trucks resident in the Valley to 2012 models, but even if we assume that to be an economically viable option, truck manufacturing capacity would make that a practical impossibility.

4. Technology

There are number of emissions sources where new technology and additional research is needed to remove barriers to achieving emissions reductions. Most notably, research and demonstration projects are needed to assess the benefits of different control technologies at confined animal facilities in the San Joaquin Valley. Additionally, there are technologies available that may reduce dust emissions from agricultural operations. However, additional research needs to be conducted to confirm the effectiveness of the control strategies.

5. Funding²⁶

To the extent emissions reductions are going to be achieved with public funding, existing incentive programs would need to be greatly expanded. Even if all the above-mentioned constraints are removed, a rough estimate is that it would require public sector investment on the order of approximately \$7.5 billion to achieve compliance with the 8-hr ozone requirement by 2012.

III. Goals, Recommendations & Objectives

A. Goals

These air quality goals have been developed within the context of the overall objectives of the Partnership. The Air Quality Work Group recognizes, for example, that air quality cannot be achieved at the expense of water quality, nor can impacts on job retention and job creation be dismissed in a region that has the highest levels of unemployment and poverty in the nation. The intent of the Work group has been to address air quality in the context of improving overall quality of life for Valley residents.

The number one goal of the Air Quality Work Group is to identify every possible means of contributing to the achievement of the federal 8-hour Ozone and PM2.5 standards by their respective attainment dates. The ARB and the District are in the process of developing a State Implementation Plan, which will show how the region will attain the standards. To complement the SIP, the Partnership is proposing actions that will maximize near-term health benefits and assist in the development of a long-term sustainable air quality environment that affords Valley residents the opportunity to enjoy clean air.

Goal 1: Achieve EPA mandated standards for 8-hr ozone and PM2.5 by the current attainment date, or as soon as practicable thereafter.

Current Status: The District currently estimates it will be some 400 tons/day short of achieving EPA 8-hour ozone standards in 2012. Current expenditures of \$15 million per year in incentive funding are generating approximately 1.5 tons per day emissions reductions (7.5 ton per day over 5 years).

²⁶ The recommendations in this document regarding funding came from the Work Group's public process. Participation by governmental agencies in providing technical assistance in this process does not represent an endorsement of those funding recommendations by these agencies.

5-Year Goal: Secure \$550 million/year for five years, primarily for incentive mechanisms to accelerate technology adoption, which will achieve emissions reductions on the order of 120 tons per day over 5 years.

Goal 2: Establish the San Joaquin Valley as a nationally recognized leader in air quality management by achieving the dual goals of healthful air quality and a prosperous economy.

Current Status: The San Joaquin Valley faces the twin challenges of attaining two federal air quality standards: the PM2.5 standard and the 8-hour ozone standard.

1-Year Goal: Implement a landmark Indirect Source Review rule to mitigate the impact from new development.

10-year Goal: Through expeditious attainment of the federal air quality standards along with progressive land use policies and effective use of mass transit, alternative energy and alternative fuels, become recognized as a national and world leader in the concurrent advancement of air quality and economic development.

Goal 3: Engage Public Support through effective communications of a comprehensive “clean air strategy”, regular monitoring and reporting of performance vs. plan, and clearer accountability for compliance.

Current Status: At present, no reader-friendly, comprehensive progress report on air quality attainment is available to Valley residents.

1-Year Goal: By mid-year 2007, the SJVAPCD publish and distribute a user-friendly air quality strategy document for the Valley, and within 3 months of the end of each calendar year thereafter, release a comprehensive annual report that describes progress towards attainment of goals (1) and (2).

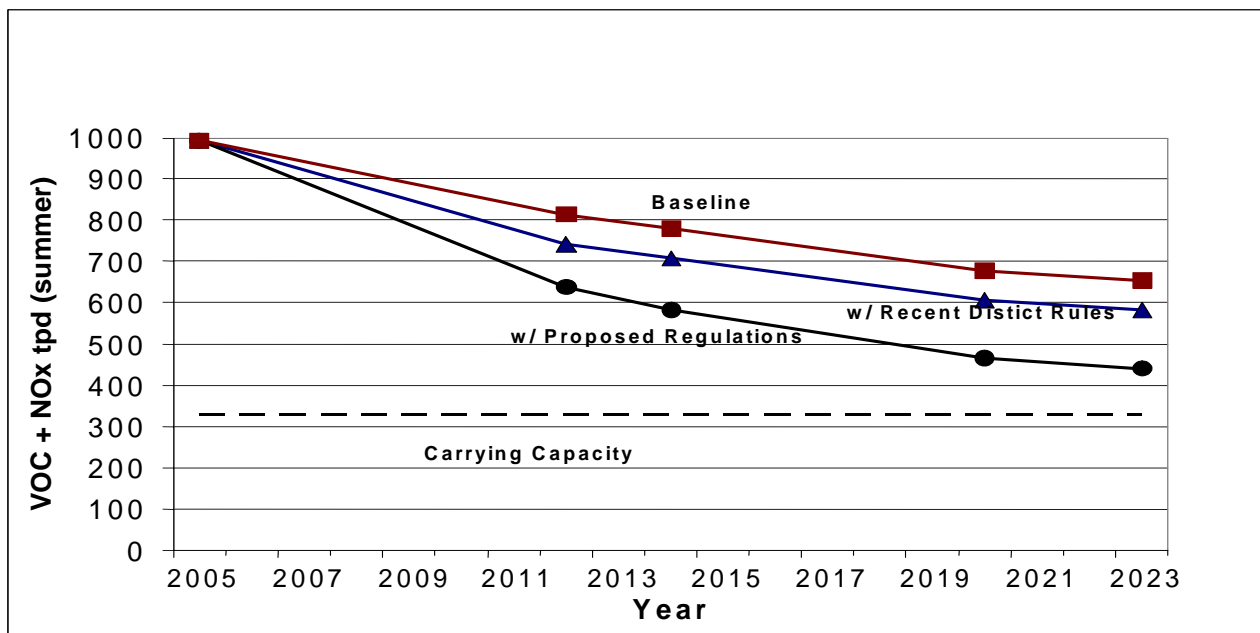
B. Baseline Metrics and Objectives

The ARB is in the process of calculating the amount of emissions reductions that will be required for the Valley to attain EPA standards by June 15, 2013. The numbers shown below as “projected 2012” are from the preliminary State Implementation Plan released by the District on October 2, 2006. and are based on current regulations and anticipated vehicle fleet turnover. As shown, there is a projected total decline of approximately 250 tons per day from 2005 levels. However, the District and ARB estimate that the combined NOx and ROG numbers will have to be reduced by approximately 418 additional tons per day in order to meet EPA standards. The two entities have identified additional emission reductions of approximately 100 tons that can be achieved through additional regulations and standards, leaving a remaining gap of 316 tons/ day to be addressed.

Annual Average Emissions (tons/day)

	2005	Projected 2012	Projected 2012 w/new Controls	Target 2012 (Capacity)
NOx	586	373		
ROG	407	367		
Total NOx +ROG	993	744	642	326

The following chart, derived from projections in the preliminary SIP shows that the Air Basin does not achieve attainment even if a “bump-up” is requested to 2020 (“severe” designation) or to 2023 (“extreme” designation).



It is important to place some perspective on these metrics. The Valley’s air quality challenges do not lend themselves to “silver bullet” solutions. As noted earlier, *elimination* of all heavy duty trucks as well as passenger vehicles from the Valley would result in only about half of the required emissions reductions. A comprehensive approach that addresses all sources is indispensable. A viable plan requires that all stakeholders see that contributions to the solution are being made by all parties.

The solutions proposed must be compatible with the sustainable economic development of the Valley. Industry stakeholders point to the adverse impact on competitiveness created by the higher cost of regulation in the San Joaquin Valley air basin compared to other air basins. This is unacceptable in a region that has the highest unemployment and poverty in the nation. The relationship between high poverty and poor health is well established in research. Funding mechanisms and alternative compliance options must be implemented to offset the higher cost of

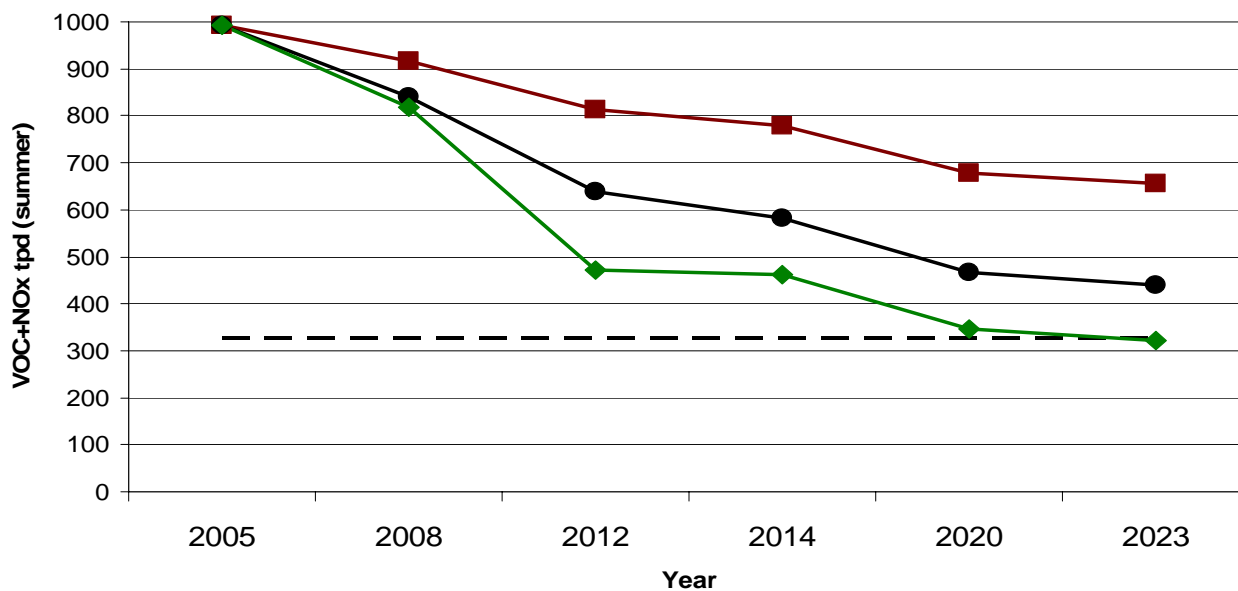
CAA compliance for the San Joaquin Valley and to subsidize accelerated adoption of emissions reduction technologies. Failure to establish such funding mechanisms and alternative compliance options will continue to create a vicious cycle for the Valley.

C. Recommendations

The recommendations proposed by the Partnership are aimed at addressing the near term issues of compliance with EPA standards as well as the longer term issues associated with the achievement of sustainable clean air in an air basin with limited air pollution carrying capacity and a high rate of population growth.

The near-term recommendations are projected to generate approximately 120 tons/day in incremental emission reductions. While this is insufficient to achieve 8-hr ozone compliance by 2012, it puts the Air Basin at compliance by 2023 and within striking distance of compliance by 2020. Most of the emission reductions come from implementation of the incentive mechanisms proposed under recommendation 3.

Figure 7 - Projected Ozone Precursor Emissions with Partnership Incentive Funding



1. **Recommendation 1: Eliminate institutional constraints to air quality improvement**

Objectives

- **Objective A: Negotiate with the U.S. EPA to address federal constraints on alternative compliance emission reduction programs.**

Traditional regulation of stationary sources of pollution has been through a command and control approach. These efforts have resulted in significant air quality benefit with many industrial sources controlling their emissions by greater than 90%. In many cases, the emissions reductions from these sources have been achieved through multiple iterations of rules on the same sources of pollution. In some cases, additional reductions are technologically difficult to achieve, and the marginal cost of additional controls can be extremely high. As the region develops plans to achieve significant reductions to attain the 8-hour ozone standard, the high cost and technological feasibility of additional control of these sources poses a significant challenge. Market based alternative compliance strategies are another way to achieve larger more cost-effective emissions reductions from these sources. In general, alternative compliance strategies provide an emissions reduction target for sources to achieve, and allow the source to achieve emissions reductions by controlling alternative sources where the cost is substantially lower and availability of emissions reduction is greater.

Existing Laws/Regulations

There is controversy among regulatory agencies as to when and how alternative compliance measures are appropriate.

Recommendation

The partnership recommends that San Joaquin Valley Air Pollution Control District, ARB, and EPA work together to determine the appropriate use of alternative compliance strategies in time for the air district to consider such strategies for inclusion in the 8-hour ozone attainment plan.

Benefits

The estimated reduction of emissions from alternative compliance strategies will vary depending upon the specific strategies adopted.

- **Objective B: Negotiate with U.S. EPA allowance of SIP credits for incentive programs.**

Current EPA policies limit the amount of credit that can be taken for Voluntary Emissions Reduction programs and do not explicitly address the types of incentive-based programs currently in place statewide. When these policies were established, they were geared toward programs with emissions reductions that relied on voluntary action with limited enforcement mechanisms under the SIP(i.e. voluntary trip reduction programs, land-use programs, and bicycle and

pedestrian programs). The EPA is working on an approach for SIP credit of incentive-based programs.

Existing Laws/Regulations

EPA guidance on voluntary emissions reduction programs.

Recommendation

Support CARB and the SJVAPCD in their efforts with EPA to establish a viable approach for crediting incentive based programs in the SIP.

Benefits

Establishing a viable approach for crediting incentive based programs in the SIP is key to the San Joaquin Valley Partnership's efforts to obtain emissions reductions through incentive based programs.

- **Objective C: Work with ARB to identify appropriate criteria for incentive programs in the Valley.**

Vehicle pollution accounts for 79% of NO_x and 40% of ROG in the Valley and will need to be aggressively attacked if there is to be any hope of meeting 8-hour Ozone standards. As shown in Chart 1, mobile sources account for 6 of the 7 top NO_x emissions sources. Collectively, those 6 sources account for an estimated 420 tons of the 2005 NO_x emissions inventory. Major impacts on Valley air quality could be achieved if all vehicles were upgraded to the most current available technology, but regulation alone cannot achieve that without serious adverse economic consequence to vehicle owners. Incentive mechanisms to accelerate technology adoption must be part of the solution. Current incentive programs are severely constrained by two factors: (a) availability of funding; and (b) limitations imposed by ARB. The total annual impact of these vehicle emissions reduction incentive programs in the Valley currently accounts for less than one ton per day of emissions reductions.

Existing Laws/Regulations

The most important of the currently available incentive programs is the Carl Moyer program. Moyer Guidelines are intended to provide some flexibility to air districts, but "minimum requirements" often constrain their use. For example, the truck fleet modernization program is currently limited to trucks "1990 or older"

Recommendation

A series of five-year pilot programs is proposed in recommendations 3(c) through 3(f) to accelerate reduction of emissions from vehicles resident in the San Joaquin Valley. These pilot programs would allow the San Joaquin Valley Air Pollution Control District to identify and fund surplus, quantifiable, cost-effective emissions reductions from vehicles within the air basin. The program would allow the District to fund retrofits, re-powers, and fleet modernization projects

based upon the relative cost-effectiveness of each project rather than prescribing the type of project based upon vehicle model year or other criteria.

Significant new funding will be required to implement these programs. Funding needs and sources are discussed later in this document. But funding alone will not achieve the objectives if current ARB constraints remain in place. The Air Quality Work Group recommends that the ARB and the SJVAPCD negotiate incentive program criteria to enable vehicle emissions reductions on the order of 100 tons per day in five years, subject to the availability of funding to support these programs.

Benefits

Emissions reductions of approximately one hundred tons per day in five years.

2. Recommendation 2: Encourage EPA adoption of tighter federal emission control standards.

Objectives

- **Objective A: Recommend that ARB work with U.S. EPA to ensure that On- and Off-Road Heavy Duty Vehicles and equipment comply with applicable new and in-use emission standards.**

The EPA is responsible for developing controls on new heavy-duty diesel engines that are utilized in on-road vehicles, for aircraft, ships, and for off-road equipment less than 175 horsepower.

Controls for heavy-duty on-road engines have not achieved emissions reductions comparable to controls that have been placed on light-duty passenger vehicles. The EPA has adopted progressively more stringent standards that phase in through 2010. While the full benefit from these requirements will be realized in the future as the existing fleet is replaced, they will not materially help attain 2013 EPA standards. The San Joaquin Valley will still have a significant number of relatively high emitting vehicles long into the future since these vehicles have a relatively long service life.

The EPA has the sole authority to regulate emissions from off-road engines less than 175 horsepower. The U.S. EPA adopted emissions standards in 1998 and again in 2004 that provided for new NO_x + non-methane hydrocarbons (NMHC), PM, and carbon monoxide (CO) emissions standards for engines within different power categories in a tiered approach, commonly referred to as “Tier” standards. These standards are defined in Title 13, California Code of Regulations (CCR), sections 2423(b) (1).

While the tiered emissions standards will provide significant emissions reductions from new equipment, emissions from existing equipment will continue long into

the future. The EPA needs to continue to develop regulations and/or provide incentives to achieve emissions reductions from sources under its control on a timeline that will achieve proportional emissions reductions sufficient to help bring the San Joaquin Valley into attainment of the National Ambient Air Quality Standards in a timely fashion.

Existing Laws/Regulations

U.S. EPA has adopted tiered emissions standards for off-road equipment, and standards for new on-road heavy-duty vehicles that phase in through 2010.

Recommendations

San Joaquin Valley stakeholders, the SJVAPCD, and the ARB need to continue to encourage U.S. EPA to adopt new standards and/or provide incentives to achieve significant additional emissions reductions from sources under federal control.

- **Objective B: Encourage U.S. EPA to develop the strongest emission control standards for locomotives and negotiate with railroads to ensure early introductions of the cleanest locomotives into the San Joaquin Valley fleet.**

At this time, moving goods with locomotives generates less pollution than with trucks, but this will not be true in the future unless locomotive engines become significantly cleaner to keep pace with the improvements to truck engines. ARB staff estimates that diesel PM emissions per ton-mile of goods moved by rail will equal or exceed comparable truck emissions by 2015, as new trucks meeting 2007 emissions standards start to reduce truck fleet emissions.

Federal law limits the abilities of states and local jurisdictions to control locomotive emissions, or to enforce rules that affect national railroad transportation.

U.S. EPA is developing new locomotive emissions standards, commonly referred to as Tier 3, modeled after the 2007/2010 highway and Tier 4 off-road diesel engine programs. These standards would likely apply to new locomotives manufactured in 2015 and beyond. The application of exhaust emissions control technologies in new locomotives, in tandem with ultra-low diesel fuel, could achieve 90 percent control of both NOx and PM emissions.

Existing Laws/Regulations

Tier 0 represents emissions levels for new locomotives originally manufactured from 1973-2001. Tier 1 standards applied to new locomotives from 2002 to 2004. Tier 2 standards apply to 2005 and newer locomotives.

Recommendations

Locomotive engines last a very long time (30 to 40 years), so special effort needs to be directed toward accelerating the placement of Tier 3 locomotive engines in the San Joaquin Valley. The Partnership recommends that U.S. EPA:

1. Adopt Tier 3 locomotive standards modeled after the 2007/2010 highway and Tier 4 off-road diesel engine programs (with 90% NO_x and diesel PM control).
2. Apply the Tier 3 locomotive standards to locomotives manufactured in 2011 and beyond.
3. Accelerate the placement of Tier 3 locomotives in the San Joaquin Valley, replacing 10% of the Valley's existing locomotive fleet with Tier 3 locomotives each year.

Benefits

The emissions reductions by 2015 due to a 40% replacement of older locomotive engines with Tier 3 locomotives in the Valley from 2011 would be 7 tons per day of NO_x.

3. Recommendation 3: Implement Incentive Mechanism to Accelerate Adoption of Air Quality Mitigation Technology

Objectives

- **Objective A: Establish Air Quality Mitigation Zones (State level designation).** Because the San Joaquin Valley's pollution carrying capacity is severely limited by the geography and climate of the air basin, achievement of 2013 EPA-mandated standards by regulation alone is impossible. Excessive regulation will also have an adverse impact on competitiveness and job creation in a region that has higher unemployment rates and more people living below the poverty line than any other region of comparable size in the nation. Research has shown a strong correlation between poverty and poor health.

Incentive mechanisms are required to accelerate adoption of technologies that will reduce emissions without adversely affecting job creation.

Existing Laws/Regulations

Existing California law specifies economic development zones and various tax and other incentives for making investments in those zones.

Recommendation

The partnership recommends approval of legislation that would require the Business, Transportation and Housing Agency to designate Air Quality Mitigation Zones based on specified air quality and unemployment criteria. With provisions similar to those that apply to Economic Empowerment Zones, businesses within qualifying communities would have access to the following:

- State income tax credit for certain equipment purchases that reduce air pollution and/or assist in the production of renewable energy; and

- Low interest loans and loan guarantees for investments to reduce air pollutants.

Designations would be for a specified number of years, renewable as long as communities meet the criteria for designation. All reductions in air pollution would be certified by the local air district and reported annually to the state.

Benefits

The Air Quality Work Group recommends initial funding of the program at \$50 million/year. Funding level to be re-evaluated based on emissions reductions achieved in first three years. When combined with the impact of Objective B below, this program is anticipated to generate emissions reduction on the order of 30 tons/day over five years.

- **Objective B: Establish Air Quality Empowerment Zone (Federal level designation).**

As pointed out in a Congressional Research Report issued in November 2005, the San Joaquin Valley has been seriously neglected by the federal Government. Per capita federal funds to the Valley are 30% below the national average (\$7 billion/year). This has contributed to the Valley having a higher rate of unemployment and more people living below the poverty rate than any other region of comparable size in the nation.

Additionally, because the San Joaquin Valley's pollution carrying capacity is severely limited by the geography and climate of the air basin, achievement of 2013 EPA-mandated standards by regulation alone is impossible. Excessive regulation will have an adverse impact on competitiveness and job creation, exacerbating the dismal economic statistics of the region. Research has shown a strong correlation between poverty and poor health.

Incentive mechanisms are required to accelerate adoption of technologies that will reduce emissions without adversely affecting job creation.

Existing Laws/Regulations

Existing federal law specifies economic development zones and various tax and other incentives for making investments in those zones.

Recommendation

The partnership recommends that the Housing and Urban Development Agency (HUD) designate Air Quality Empowerment Zones (AQEZ) in U.S. air basins that (a) have been designated by the EPA as non-attainment for PM_{2.5} and serious or severe non-attainment for ozone; and (b) have had an unemployment rate 50% or more above the national average for two of the three years preceding designation. Businesses within qualifying AQEZ's would have access to the following:

- Ten-percent tax credit for certain equipment purchases that reduce air pollution and/or assist in the production of renewable energy;

- New employee tax credits;
- Accelerated 3-year depreciation schedule; and
- Low interest or no-interest loans to small businesses for investments to reduce air pollutants.

Designations are for a term of seven years and may be renewed as long as communities meet the criteria for designation. All reductions in air pollution would be certified by the local air district and reported annually to HUD and the EPA.

Benefits

The Air Quality Work Group recommends initial funding of the program at \$100 million/year. Funding level to be-revaluated based on emissions reductions achieved in first three years. When combined with the impact of Objective A above, this program is anticipated to generate emissions reduction on the order of 30 tons/day over five years.

- **Objective C: Establish and fund a 5-year program to scrap and replace approximately 6,000 of gross polluting passenger vehicles per year and achieve 20 tons/day emissions reduction over 5 years.**

The San Joaquin Valley is one of the nation's worst air basins, and suffers from poverty and childhood asthma rates that are among the worst in the nation. A small percentage of automobiles cause a disproportionate amount of pollution. The data demonstrates that 35 to 50% of total exhaust emissions come from fewer than 10% of California vehicles. On average, older vehicles that are 20 to 25 years old produce up to 30 times more emissions than newer vehicles and a gross polluter can produce up to 40 pounds of smog-forming vehicle emissions per year. Most owners of high-polluting vehicles are from low income families that cannot afford to buy a complying vehicle.

Existing Laws/Regulations

Two programs offer cash payments to encourage the accelerated retirement of vehicles from service:

- A Bureau of Automotive Repair program targets vehicles that have failed their required biennial smog inspection within the last 120 days. Vehicle owners are eligible for up to \$500 for smog check-related repairs or up to \$1000 to retire the vehicle.
- Air Resources Board (ARB) programs target vehicles that pass or are exempted from their biennial smog inspection. Owners are eligible for up to \$1000 to retire a vehicle. The South Coast just initiated a program to provide up to \$2000 to low income participants. Local districts may use emissions reduction credits generated through vehicle retirement to offset other required emissions reductions. Each vehicle is a separate project and

must be cost-effective, with the size of the credit determined by ARB over the three-year project life.

Recommendation

The Partnership recommends a pilot program to provide low-income families up to \$4,000 to scrap a gross-emitting vehicle and replace it with a low-emitting vehicle (model 1998 or newer and passing Smog Check). The Partnership also supports a program to enable owners of non-polluting vehicles to donate vehicles which can be made available by the State to low-income families wishing to scrap and replace their gross-emitting vehicles. Owners of donated vehicles can claim the fair market value as a deduction on their income taxes.

Funding of approximately \$24 million per year will be required scrap and replace approximately 6,000 vehicles per year. Funding sources to implement this program are discussed later in this report.

Benefits

ARB has estimated the reduction of emissions over a five year period to be up to 20 tons per day of ROG and up to 12 tons per day of NOx.

- **Objective D: Establish and fund a 5-year program to scrap and replace approximately 7,500 heavy duty diesel trucks and achieve 60 tons/day emissions reduction over 5 years.**

Heavy duty vehicles (HDVs) cause a disproportionate amount of pollution. Even though the population of all on-road HDVs account for approximately one percent of all on-road vehicles, they emit about 57 percent of the on-road statewide NOx emissions, 16 percent of the statewide reactive organic gases (ROG) emissions and 44 percent of the statewide PM10 emissions. This issue is aggravated in the San Joaquin Valley, where seasonal use of trucks in the farming industry prolongs the life of heavy duty trucks.

Current voluntary efforts to reduce emissions from heavy duty trucks have been primarily through incentive funding of retrofits, fuel changes, or re-powering vehicles with newer/cleaner engines. These projects have not been attractive to San Joaquin Valley truck owners because the investments are costly and do not significantly reduce operating cost (in some cases operating costs are higher). Further, repowering programs are generally less cost-effective than fleet modernization in use of taxpayer dollars.

Existing Laws/Regulations

The Carl Moyer program currently only allows fleet modernization projects older than 1990 model year.

Recommendation

A five-year program is proposed to accelerate reduction of emissions from heavy duty trucks resident in the San Joaquin Valley. The pilot program would allow the

San Joaquin Valley Air Pollution Control District to identify and fund surplus, quantifiable, cost-effective emissions reductions from trucks within the air basin. The program would allow the District to fund retrofits, re-powers, and fleet modernization projects based upon the relative cost-effectiveness of each project rather than prescribing the type of project based upon vehicle model year. Funding of approximately \$300 million per year will be required to generate cumulative NOx reductions of 60 tons per day over five years. Funding sources to implement this program are discussed later in this report.

Benefits

The estimated reduction of emissions from the pilot program is 60 tons per day by the end of the fifth year of the program. This is the most impactful of the strategic actions proposed by the Air Quality Work Group, even though it achieves only about 15% of the emissions reductions required to achieve the 8-hour ozone standard.

- **Objective E: Establish and fund a 5-year program for off-road equipment to achieve 10 tons/day emissions reduction over 5 years.**

According to the California Air Resources Board, emissions in 2010 from diesel-fired off-road agricultural equipment, including tractors and harvesters will be 96 tons per day of NOx statewide, and 42 tons per day of NOx in the San Joaquin Valley. In addition, construction and mining equipment in the Valley emit another 27 tons per day of NOx. There is a need for a pilot program to fund replacement of agricultural equipment when its age is too old to retrofit. Currently, the Carl Moyer Program will not fund “replacements” of older equipment, because of the perception that this equipment will be replaced anyway as a normal part of business. This type of automatic replacement may be common elsewhere, but is not true in the agricultural industry, where equipment is used on a seasonal basis and is kept for many years past its “normal” lifespan. As an example, over 60% of the forklifts used in agriculture are over 25 years old and cannot be retrofitted whereas in a continuous-use, normal operation, a forklift is replaced after only 5 – 10 years. Other examples of sources that could benefit from such a change include diesel trucks used in the transportation of agricultural products, as well as on-field implements of husbandry including tractors and harvesters.

Existing Laws/Regulations

California Health and Safety Code – Chapter 9, Articles 1 – 14, Sections 44275 – 44299.2

Carl Moyer Program Guidelines, Revised January 6, 2006

Recommendation

The Partnership recommends the development of a five-year Off-Road Equipment Scrap and Replace Pilot Program for the funding of replacement off-road equipment, including agricultural and construction equipment. The pilot program would allow the San Joaquin Valley Air Pollution Control District to identify and fund surplus, quantifiable, cost-effective emissions reductions from off-road

equipment within the air basin. The program would allow the District to fund retrofits, re-powers, and fleet modernization projects based upon the relative cost-effectiveness of each project rather than prescribing the type of projects that are eligible for funding.

It will be necessary to pass legislation that authorizes the development of such a program. Legislation to achieve a similar purpose for fleet modernization for trucks was passed in 2004 (AB 1394, Levine).

Funding of approximately \$50 million per year will be required to generate cumulative NOx reductions of 10 tons per day over five years. Funding sources to implement this program are discussed later in this report.

Benefits

ARB staff estimates emissions reductions due to the implementation of such a program to be up to 10 tons per day of NOx (assumes incremental 20% of valley diesel agricultural and construction fleets will be replaced, with 70% reduction in NOx). This does not reflect the added benefit of emissions reductions in PM10 and PM2.5.

- **Objective F: School Bus Fleet Modernization.**

A District study shows that cancer risk associated with a child riding in a school bus is significantly higher than ambient levels. There are a disproportionate number of older buses operated by school districts within the District. The average age of the Valley school bus fleet is 16 years old, with the oldest 850 buses averaging over 26 years old.

Existing Laws/Regulations

The Lower-Emissions School Bus (LESB) and the Carl Moyer program provide funding to address the aged school bus population. Currently, funding through both programs does not sufficiently address the entire California aged school bus fleet. Pending voter approval of the infrastructure bond, the influx of \$200 million into LESB would provide funding to address this statewide issue. However, the Valley has a disproportionately higher number of older school buses and may require additional funding attention. AB 923 allows air district governing boards with the authority to approve \$2 increase in motor vehicle registration fees. Such an adjustment may provide up to \$55 million directly to the local air district for use in specific incentive programs

Recommendations

The Partnership supports the inclusion of the \$200M in state resources proposed for school bus replacement, with the oldest buses receiving first priority. Should the proposed resources fall short of the school bus replacement need, additional resources should be identified to meet this need (possibly including increased motor vehicle registration fees). The Partnership supports recent modifications to the Carl Moyer Fleet Modernization Guidelines (School Bus component):

- Project life for pre-1977 school buses changed to five years;
- Project life for 1977 and newer school buses changed to eleven years;
- Waive model year school bus requirements;
- Waive school bus engine warranty requirements;
- Waive electronic monitoring units requirements;
- 80% funding limit waived provided the cost-effective criterion is met; and
- California Highway Patrol safety certification requirements.

Additionally, the Partnership proposes the following Carl Moyer guideline modifications

- Increase the weighting factors in determining particulate matter (PM) reductions for cost-effectiveness purposes to account for children's exposure to toxic air contaminants;
- Establish emissions factors for school buses similar to those used for urban buses; and
- Allow district-governed minimum rebuild costs to be used in determining the maximum incentive.

Benefits

Reduce the exposure of school children to cancer risk.

4. Recommendation 4: Promote Clean Energy Projects

Objectives

- **Objective A: Establish a San Joaquin Valley Clean Energy Office**

Given the limited pollution-carrying capacity of the San Joaquin Valley, accommodation of the region's projected growth will require accelerated adoption of the most advanced clean energy technologies available. The region has natural assets (abundant sun, wind, biomass, etc.) that can be converted to clean energy. A significant contribution to the improvement of the Valley's air quality can be made by accelerated adoption of clean energy technologies.

The Valley has historically received back far less public goods funding for energy efficiency than it has contributed through its ratepayers (\$29.6 million, or 24%, for the period 2000-2003 for PG&E customers alone). In part, this is because small rural communities do not have the expertise to access these funds or the critical mass to implement efficient projects.

Existing Laws/Regulations

With the concurrence and support of the California Public Utilities Commission and relevant utility companies, regional energy offices have been established in San Diego, the South Bay, Cities in the Los Angeles area, the Redwood Coast and Ventura County to help accelerate adoption of clean energy technologies

Recommendation

(Developed in collaboration with the Water/Energy and Economic Development Work Groups)

The California Partnership recommends establishment of a San Joaquin Valley Regional Energy Office to serve as a catalyst to expand capacity for clean energy technologies throughout the San Joaquin Valley, with special emphasis on assistance to the Valley's smaller rural communities. While many design issues remain to be resolved, it is expected that the office will educate and inform, conduct regional clean energy-related studies, develop regional clean-energy strategies and projects, implement demonstration projects, provide technical assistance, apply for grants to support studies and projects, serve as an information clearing house for clean energy, and generally advocate for, support and develop clean energy adoption throughout the San Joaquin Valley. The office will be designed to strengthen and not duplicate existing clean energy programs and is expected to serve as a delivery channel for implementing many of the clean energy recommendations from the Partnership.

Benefits

It is reasonable to target a 10% replacement of conventional energy sources with clean technology by 2013. Achievement of that target would generate estimated emissions reductions in the range of (TBD).

- **Objective B: Establish San Joaquin Valley Clean Vehicle Information Exchange.**

The biggest emissions reductions in the Valley are expected to come from what the ARB calls the "in-use" fleet. Vehicle technology and regulations, particularly in the heavy-duty sector, are changing rapidly. From liquefied natural gas and compressed natural gas to ultra low-sulfur diesel and biodiesel, from retrofits to hybrids to selective catalytic reduction, the array of technology options is often bewildering to vehicle operators.

Existing Laws/Regulations

In 2004, new EPA heavy-duty vehicle on-road standards were implemented to cut new vehicle emissions in half. Beginning in 2007, to be fully implemented by 2010, a new round of standards will cut emissions by an additional 90 percent. In addition, in the second half of 2006, a nationwide ultra-low sulfur diesel standard will be implemented.

Recommendations

CALSTART, a non-profit company dedicated to economically viable transportation solutions that clean the air, has proposed the formation of the San Joaquin Valley Clean Vehicle Information Exchange (CVIE). The Partnership recommends acceptance of this proposal and encourages federal funding of this proposal.

The CVIE would serve as a clearinghouse of information on the wide variety of clean air technology products and solutions that are available to fleets and consumers in the San Joaquin Valley. The CVIE staff would be available to work with fleets and consumers, to assess their needs and to then provide a list of recommended options based on cost-benefit analyses. The CVIE staff would also be well versed in the public funding opportunities that would be available to fleets as well as consumers. The CVIE would work closely with and function as an adjunct to the San Joaquin Valley Air Pollution Control District to help disseminate information about their financial assistance programs.

CALSTART has requested a federal earmark to help seed the launch of the CVIE. The CVIE is expected to be self-supporting within three years of launch.

Benefits

A professional, experienced staff will help accelerate the timetable for adoption of air quality mitigation technologies in heavy duty vehicles.

- **Objective C: Implement Community Choice Aggregation Project.**

The San Joaquin Valley (and the greater Fresno region) has been designated by the California Independent System Operator (CAISO) and the California Energy Commission as a region lacking in local electrical generation. Despite the significant residential and commercial growth, no new major generation resources have been added to the region since 1984. Concerns about the reliability of power supply and the cost of electricity are impediments to the economic revival and growth for our region.

The Kings River Conservation District (KRCD), a local resource management agency serving portions of Fresno, Kings, and Tulare counties, is in the process of developing conventional and renewable local electricity projects. KRCD's projects are aimed at improving the local reliability of energy supply, reducing electrical costs to the consumer and improving air quality.

Twelve San Joaquin Valley cities and Kings County are in the process of forming a joint powers agency (JPA) Community Choice Aggregation (CCA) entity for the Region. It will contract with KRCD for power supply, thereby providing the customer base to allow for the financing of the local energy generation. Financial analysis has conservatively estimated that the region will enjoy a four to six percent reduction in annual electricity prices under the CCA program and will reduce energy costs for the above listed entities by approximately \$800 million over a 20-year period. In addition, the JPA will have the opportunity to create electric economic development rates to attract and retain businesses to the region.

Existing Laws/Regulations

California Assembly Bill 117 (2002) authorized Community Choice Aggregation (CCA). CCA allows cities and counties to aggregate the electric load of their constituents for the purpose of selecting an alternative energy supplier

(aggregated direct access). The California Public Utilities Commission (CPUC) has finalized rules related to CCA, but is continuing to work on guidelines and procedures for CCA applicants (cities and counties).

Recommendation

(Developed in collaboration with the Water/Energy Work Group)

The Governor and Legislature should recognize and embrace CCA as an important part of California's energy solutions. CCA allows communities to utilize their powers to encourage local energy choices and developments to meet local needs. No new energy legislation that would restrict or limit CCA should be considered.

Benefits

As part of the Community Choice project, KRCD is committed to a portion of the 20 percent Renewable Portfolio Standard coming from locally sited renewable projects, maximizing the opportunities for using agricultural waste and dairy bi-products to produce clean energy and improve the Valley's air quality.

- **Objective D: Net metering within same agricultural operation or water district.**

Alternative energy projects are being installed at agricultural operations (e.g. solar photovoltaic cells at irrigation pumping stations and cold storage facilities and digesters at dairies) that have the ability to offset or significantly reduce the emissions of NOx, VOCs, and PM10. However, many such opportunities have gone untapped due to the limitations of the current net metering program. Throughout the year, there are times when these projects produce more energy than they are utilizing on-site. At the end of the year, excess energy that may have been produced is simply lost and the meter is "zeroed out." This is a disincentive for operations attempting to achieve payback on their investments. More importantly, the current system provides no incentive to install renewable energy projects in locations where little or no energy consumption occurs, regardless of their potential for energy generation (e.g. in-conduit hydroelectric generation, solar facilities).

Existing Laws/Regulations

- Biogas Net Metering Program – Limited solely to dairies, allows the consumer to "aggregate" different meters to offset off-site consumption of electricity.
- Solar/Wind Net Metering Program – No aggregation of additional accounts.
- Self-Generation Incentive Program – Provides funds from the CPUC via the utilities to invest in self-generation, with larger grants for the cleanest projects.
- Current Utility Rate Design Scheme – Disallows agricultural customers from aggregating accounts. Aggregation of accounts can reduce demand charges.

- Current Demand Response Programs – Provide incentives for customers to respond during critical system times through shaving on-peak load to reduce overall peak demand. Participation by agricultural businesses is currently very limited since they cannot participate as an overall operation, but rather as a multitude of “customers.”

Recommendation

The partnership recommends the Governor and Legislature develop legislation that would implement a net metering scheme that allows for the transfer of excess energy to other meters within the same agricultural operation or same water district, or requires the utility to compensate the self-generator for excess energy at the market price reference for renewable power. The partnership further supports ongoing discussions regarding aggregation for demand response programs currently taking place among customer groups and the utilities per CPUC Decision 06-03-024.

Benefits

TBD

- **Objective E: Incentivize use of agricultural biomass for fuel and energy production.**

The San Joaquin Valley produces a significant amount of agricultural waste each year. A large amount of this material is chipped and re-incorporated in the fields. Of the remaining 1.67 million tons/year of agricultural waste, approximately 406,000 tons/year are utilized by biomass facilities to produce electricity. The majority of the remaining material is burned uncontrolled in the fields.

SB 705 (Florez) which was signed into state law by the Governor in September, 2003 requires the phase-out of agricultural burning in the San Joaquin Valley based upon the following schedule:

- Commencing June 1, 2005, for field crops, prunings, and weed abatement.
- Commencing June 1, 2007, for orchard removals.
- Commencing June 1, 2010, for other materials, vineyard removals, and surface harvested prunings.

SB 705 contains a provision that the implementation date for the phase-out may be delayed if there are no viable alternatives available to dispose of the material. Biomass and biofuels present the greatest opportunities to utilize this material.

Existing Laws/Regulations

SB 705, SJVAPCD Rule 4103-Open Burning

Recommendation

Establish a workgroup with members of the agricultural community, public utilities, CPUC, SJVAPCD, and the biomass industry to identify any barriers to the expanded use of agricultural waste material for the production of energy and develop recommendations to overcome those barriers.

5. Recommendation 5: Improve People and Goods Movement

Objectives

- **Objective A: Evaluate Highway Tolling Option** (*joint recommendation with Transportation Work Group*).

Highway 99 and Interstate 5 are two of the most congested major corridors in the nation. SR 99 carries two to three times more truck traffic per lane (18% to 27%) than the average for the state of California (9%). Trucking is the dominant mode for goods movement within the San Joaquin Valley, accounting for 87% of outbound tonnage and 81% of inbound tonnage. It is estimated that as much as 30% of total truck commodity movements in the Valley may involve through traffic. Population in the Valley increased 56% from 1981 to 2000, while vehicle miles traveled (VMT) more than doubled (136% increase). VMT continues to grow at more than twice the rate of population growth. This contributes to the fact that the SJV is one of the worst areas in the country for air quality, much of which is derived from the transportation of goods from and through the region

Existing Laws/Regulations

The Federal Highway Administration's (FHWA) Value Pricing Pilot (VPP) Program offers pre-implementation grant funding to identify and develop feasible, innovative road-pricing projects to relieve highway congestion and related air pollution.

Recommendations

(Proposed jointly with the Transportation Work Group)

The Partnership recommends that the Governor work with the appropriate agencies, the legislature and the Congressional Delegation to ensure that efforts to research and evaluate road pricing projects on the two main corridors, and their air quality benefits, are funded and staffed.

A proposal has been submitted to the FHWA by the Fresno COG and Caltrans to fund a study to (a) conduct research and analysis about road-pricing systems and configurations that would relieve truck congestion and pollution on SR-99 and I-5; (b) bring key stakeholders together and develop consensus about the most feasible and viable road-pricing project(s); and (c) educate, through marketing and media outreach, policymakers, opinion leaders and the general public about the selected project(s) and their benefits, with a goal of advancing these projects into the regional and state transportation plan for implementation. A wide range of options will be evaluated by consultants overseen by a broad-based stakeholders group. These options include congestion-management tolls designed to prevent peak-hour congestion at key bottlenecks affecting goods movements; emissions-based truck tolls that might reduce congestion and pollution; rush hour shoulder lanes; truck-only toll lanes; and intermodal truck-rail freight systems that could reduce congestion and truck traffic on the San Joaquin Valley roadways.

Benefits

Engagement of key stakeholders, technical evaluation of the best pricing options, and development of public support, are expected to serve as the basis for adoption of the chosen tolling option into the state transportation plan, followed by pursuit of funds for actual construction of the selected option(s). Proceeds of a road pricing project are expected to be partially used for air quality mitigation.

- **Objective B: Urban Traffic Synchronization Pilot.**

As the number of vehicle miles traveled continues to increase, the level of congestion along major arterials has also increased, resulting in longer commuting times, higher fuel and vehicle maintenance costs, and an increase in harmful “hot-spot” emissions levels due to idling and slower vehicle speeds. In many cases, increasing capacity within these corridors is not feasible due to lack of funding and/or the ability to acquire the needed right of way. Also contributing to the problem is the lack of a multi-jurisdictional traffic management strategy that could be used to better coordinate capacity within adjacent jurisdictions.

Although there are Intelligent Transportation System (ITS) technologies available that can be used to synchronize traffic lights in order to improve traffic flow, many of the jurisdictions within the San Joaquin Valley do not have the adequate resources needed for such an investment. In fact, most counties and cities are struggling to just provide the basic municipal services. Even if a community was fortunate in acquiring grant funding to install such a system, most have no funding available to provide for ongoing maintenance and/or operational related costs.

The air quality benefits of traffic synchronization are a subject of controversy. Local governments and Caltrans contend that the ability to improve traffic flow has a direct impact on the levels of vehicle emissions since these vehicles would be subject to fewer stops and subsequent periods of idling or low speeds. CARB believes that emissions reductions are relatively small and temporary.

Existing Laws/Regulations

Capacity improvements and management of the State’s freeway/highway system is provided by Caltrans and the California Highway Patrol. Maintenance and improvements to local streets are generally provided through a jurisdiction’s Public Works and Police/Sheriff Departments. Emissions reductions from traffic synchronization are not SIP creditable.

Recommendation

Allocate funding to a 5-year pilot to evaluate the air emissions benefit of a multi-jurisdictional traffic management system in which various agencies, including Caltrans, agree to deploy ITS technologies and to jointly manage traffic capacity within the region.

Benefits

Determine the air-quality benefits and cost-effectiveness of traffic synchronization.

- **Objective C: Evaluate/Implement Short Sea Shipping**
See Transportation Work Group Recommendations.
- **Objective D: Net metering within same agricultural operation or water district.**
See Transportation Work Group Recommendations.
- **Objective E: Incentivize use of agricultural biomass for fuel and energy production.**
See Transportation Work Group Recommendations.

6. Recommendation 6: Encourage “Green” Local Government

Objectives

- **Objective A: Accelerate Use of Clean Energy Technologies in Municipal and State Operations**

Municipalities continue to struggle with increases in operating costs due to employee services, energy, and regulatory requirements. Public fleets, such as transit buses and refuse trucks, are also subject to more stringent emissions requirements resulting in many public fleet operators providing the “real world” testing of evolving clean air technologies that may be used to reduce emissions from private fleet operators. Because these standards only apply to public fleets, many of these new and cleaner technologies can be more expensive to operate, maintain, and can require different types of fuels and/or new infrastructure. Although public agencies are willing to participate in improving regional air quality, the increase in operating costs can also have a direct impact on the cost of providing essential services.

Similar comments apply to State-owned fleets operating in the Valley (e.g. CalTrans).

Existing Laws/Regulations

The California Air Resources Board regulates emissions levels for all motor vehicles in the State of California, including state and municipal fleets, although the South Coast Air Quality District has also established public fleet standards that are even more stringent than those imposed by ARB.

Recommendation

Amend the Carl Moyer and the San Joaquin Valley Air Pollution Control District’s ISR funding guidelines so that they recognize and fully fund the incremental cost of vehicles that exceed comparable fleet standards, infrastructure, and ongoing operating costs until such applicable fleet and fuel

standards are homogenized. Funding should also be earmarked for the development of advanced low emissions technologies and fuels such as hydrogen and hythane.

The Governor and legislature should set more stringent goals for reducing emissions from state-owned fleets operating in the Valley.

Benefits

For municipalities, the proposed funding would be used to offset the additional cost associated with the acquisition of cleaner vehicles and related infrastructure improvements. This in turn will accelerate the replacement of municipal fleets while providing an opportunity to provide real world testing of advanced low emissions technologies and fuels.

- **Objective B: Include Air Quality Scoring Criteria in all Municipal and State Procurement Contracts.**

Municipal government procurement policies are generally structured so that public works projects are awarded to a contractor/vendor who submits the lowest bid, although there are situations in which an agency can choose to include special provisions to be considered other than the lowest cost. Experience of the contractor, subcontractors, special qualifications, life cycle costs, are just a few examples of special requirements that an agency can use to award a contract even if a vendor/contractor has not submitted the lowest bid. In some cases, federal law also requires public agencies using federal grant funds to include special provisions related to disadvantaged or minority businesses, and domestic product content. Even though agencies have the flexibility to include special provisions for public works projects, many fail to recognize or consider bid alternatives that could be used to mitigate the air quality impacts of various public works construction projects.

Existing Laws/Regulations

Procurement policies and procedures are established by individual jurisdictions and/or by the federal government in the event that federal funding is used.

Recommendation

Encourage public agencies within the San Joaquin Valley to include a provision that would require vendors/contractors to submit alternative bids that incorporate emissions mitigation strategies such as those outlined in the District's Indirect Source Rule. Agencies would then evaluate the cost effectiveness of the clean air bid alternative(s) and recommend an award to their Boards accordingly. Agencies would work with the District to confirm emissions reductions and determine whether there are other funding sources that could be used to offset the cost of a clean air bid alternative.

Benefits

Municipalities in the San Joaquin Valley let contracts valued in the hundreds of millions of dollars and are in a unique position to beneficially influence air quality mitigation in major works. By including such AQ scoring criteria into all public works contracts, significant emissions reductions can be obtained.

- **Objective C: Adopt Green Building Standards**
See Land Use, Housing and Agriculture Work Group Recommendations.
- **Objective D: Net metering within same agricultural operation or water district.**
See Land Use, Housing and Agriculture Work Group Recommendations.

7. Recommendation 7: Accelerate Research of Critical Emissions

Objectives

- **Objective A: Agricultural PM10, PM2.5 and ROG Emissions Research.**
California agriculture is now being regulated in many areas, including the requirement to address fugitive PM10 from farming practices. Specific and targeted research is now needed to provide quantitative data on new types of practices and equipment the agricultural community can utilize to reduce PM10 emissions.

There is a substantial need to conduct research on fugitive PM10, PM2.5 and ROG from agricultural practices. This includes the need to conduct studies to evaluate new approaches to emissions reductions from agricultural operations, and to evaluate conservation tillage for its potential emissions reductions and expansion to other crops. In addition, there is a need to conduct comparative assessments on new types of agricultural equipment, such as almond harvesters, cotton pickers, tillage equipment and many others.

Existing Laws/Regulations

Fugitive PM10 emissions from agricultural operations are regulated in the San Joaquin Valley by Rule 4550 – Conservation Management Practices. This rule requires growers with land in excess of 100 acres to implement five (5) conservation management practices (CMPs) for each crop they grow. These CMPs are intended to reduce PM10 emissions from land preparation and cultivation, harvesting, unpaved roads, unpaved equipment yards and others sources, such as windblown dust and pesticides.

Recommendation

The Partnership recommends that the ARB work with the District, agriculture, academia and other interested stakeholders to evaluate the need and set priorities for research on agricultural equipment, agricultural operations such as

conservation tillage methods, and other approaches for reducing agricultural emissions. Additionally, the Partnership recommends the ARB identify projects that could qualify for funding under the Innovative Clean Air Technologies (ICAT) program and through other funding sources. It is recommended that the proposed evaluation, priority setting and identification of project funding sources be completed not later than January 31, 2007.

Benefits

The emissions reductions benefit from the implementation of Rule 4550 will be much more comprehensive and accurate. More important, it is anticipated that the proposed research will lead to new lower emitting equipment or other innovative approaches to help farmers reduce PM10, PM2.5 and ROG emissions.

- **Objective B: Research Dairy Emissions Sources and Best Available Control Technology (BACT).**

Dairy products and cattle sales are California's most valuable agricultural product, worth more than \$6 billion per year. Over the last 30 years, the number of milk cows has doubled to more than 1.7 million, with most of this growth occurring in the San Joaquin Valley, where 80% of the state's dairy cows now reside. This has resulted in a corresponding increase in air emissions from dairies. Livestock waste is the second largest source of ROG emissions in the San Joaquin Valley and growing faster than any other source (from 8% of ROG inventory in 1990 to 16% in 2005). For the most part, dairy emissions are area sources of air pollution, emitted diffusely (termed "fugitive" emissions). Relatively little is known about the efficacy of best available control technologies (BACT) and best available retrofit control technologies (BARCT). In addition, different waste management techniques often involve tradeoffs between protecting air and water quality. While there are many technology vendors, most of their offerings are unproven and lack independent scientific and cost-effectiveness assessment. There is very little public funding available for sound third party verification and evaluation of emissions control options. Dairy producers fear their investments in pollution control measures will prove ineffective.

Existing Laws/Regulations

SB 700 enacted in 2003 removed permit exemptions from Agriculture, including dairies. On June 23, 2005, the ARB adopted a statute for large confined animal facilities (1,000 lactating cows and above). The District, obligated to enact BACT and BARCT rules by July 2006, established a Dairy Permitting Advisory Group (DPAG) to help evaluate options. Operators must submit permits by January 2007 for July 2007 implementation.

Recommendations

1. Secure \$7.5 million in state funding to accelerate research and third party evaluation of innovative technologies and approaches to dairy waste control measures.

2. Secure \$30 million in funding under the 2007 Federal Farm Bill to conduct BACT and BARCT demonstration projects.
3. Establish a working group of regulatory, industry and public interest representatives to evaluate long-term systemic approaches to air and water pollution control from dairy operations and funding mechanisms that enable accelerated adoption of control technologies while retaining economic viability for the industry.

Benefits

Accelerate emissions reductions from dairy operations. Dairy ROG emissions are projected to increase from 39 tons/day in 2005 to approximately 52 tons/day in 2015. These recommendations are targeted to reduce 2013 emissions to under 30 tons/day.

8. Recommendation 8: Improve Public Understanding of Air Quality Issues and Solutions

Objectives

- **Objective A: Conduct Public Education Campaign.**

The air quality regulatory process in the San Joaquin Valley has intensified in recent years but the level of public education about the overall issues has not kept pace. Previously unregulated major sources of air pollution, e.g. dairies, are now being regulated through a District permit process. A new, ground-breaking approach for achieving air quality goals as part of land-use development has been adopted under the Indirect Source Rule. However, a number of experts believe that, given the rapid population growth in the Valley and the far more limited pollution-carrying capacity of the air basin compared to other air basins, achievement of the new Federal 8-hour ozone standard by 2013 (and the comparable PM 2.5 standard) will require significantly more emissions reductions from non-traditional sources that are beyond the regulatory scope of existing air quality legislation.

Achieving these new standards will depend on several factors including (1) a deeper appreciation of the region's air quality challenge by those actors who are currently not subject to air quality regulations, including the general public, businesses, NGOs, local governments, and related public institutions, and (2) a corresponding willingness on the part of those same actors to initiate behavioral change and/or related programs that culminate in measurable emissions reductions. Some public education efforts are underway by state regulatory agencies and the District. However, the funding levels and staff resources allocated to these educational programs are insufficient given the magnitude of the challenge.

Recommendations

The Partnership recommends the creation of a public education task force convened by Cal/EPA composed of representatives from regulatory agencies, public interest organizations, public sector institutions and the private sector. The task force will examine the opportunities and constraints to more effective strategies for using public education to influence consumer behavior to achieve air emissions reductions; conduct a best practices evaluation of successful air quality education efforts in California and elsewhere; and recommend options for improving funding of air pollution public education.

Benefits

The proposed evaluation would provide a more objective and systematic assessment of whether increased investments in public education would be cost-effective, and identify the most appropriate strategies, messages, and messengers.

- **Objective B: Publish and distribute “user-friendly” Air Quality Improvement Plan and Annual Progress Report**

Surveys show that air quality and jobs are the most serious concerns of residents of the San Joaquin Valley, yet there is no single entity that is accountable for cleaning up the Valley’s air in a way that is consistent with sustainable economic development. The U.S. EPA is ultimately accountable for achievement of clean air throughout the nation, but it has responsibility for hundreds of air districts; its role is primarily one of enforcement of standards; and it is neither chartered nor designed to address clean air in the context of sustainable economic development. The ARB has is responsible for the development of a State Implementation Plan (SIP) for the Valley to comply with EPA standards and it has a role in monitoring implementation of all such plans in the State. The District has responsibility for stationary sources, but is largely out of play for mobile sources, which are the largest contributor to the Valley’s poor air quality.

While this approach may be appropriate given the complexity of the issues being addressed and the need to divide responsibilities between issues that are most appropriately addressed at the federal, State and local level, it does not provide a clear focal point for the development, implementation and performance monitoring of a creative, comprehensive approach to the Valley’s unique air quality issues in the context of other Valley challenges.

Existing Laws/Regulations

The EPA is responsible for the implementation of the federal Clean Air Act (CAA). In addition it regulates the manufacture and use of mobile sources in conjunction with ARB. The ARB is also responsible for the California Air Pollution Control Laws, including the California Clean Air Act. This includes responsibility for monitoring the regulatory activity of California's 35 local air districts, including the San Joaquin Valley Air Pollution Control District, which is responsible for promulgating rules and regulations for stationary sources in the San Joaquin Valley. The Federal Clean Air Act requires that each state prepare

State Implementation Plans, and in turn, local air districts prepare local SIPs that feed into that document. These documents are updated every five years.

Recommendation

As useful as it might be to have responsibility, authority and accountability for cleaning up the Valley's air rest in a single entity, this is neither practical nor politically feasible. The Partnership recommends instead that the District be charged with the responsibility of producing an annual report of the Valley's progress against its SIP plan and the recommendations that are made in this report. The annual report, to be prepared in close consultation with the ARB, would address progress on all mobile and stationary sources and offer recommendations where progress is lagging. The report would be written in terms that would be easily understood by Valley residents and widely distributed to the press and to all major stakeholder groups, including the Partnership Board.

Benefits

Provide a comprehensive report that will enable all Valley stakeholders to monitor progress and propose corrective actions when appropriate.

C. At-A-Glance Matrix

Air Quality				
<p align="center">Mission Statement</p> <p><i>Enable residents to enjoy healthy air, removing the adverse impacts of poor air quality on health, quality of life and the economy.</i></p>				
<p>Indicators: Decrease in ozone precursors. Decrease in particulate matter. Decrease in number of days with 8-hour ozone exceedances. Increase in the use of clean energy. Increase in the use of clean fuels. Decrease in attributable mortality rates. Decrease in asthma rates.</p>				
Immediate Actions (First Year)	Short Term Actions (2-3 Years)	Intermediate Actions (4-6 Years)	Long-Term Actions (7-10 Years)	Responsible Implementer
<p>Overall Goals: (1) Achieve EPA mandated standards for 8-hour ozone and PM2.5 by the current attainment date, or as soon as practicable thereafter. (2) Establish the San Joaquin Valley as a nationally recognized leader in air quality management by achieving the dual goals of healthful air quality and a prosperous economy. (3) Engage public support through effective communications of a comprehensive "clean air plan", regular monitoring and reporting of performance vs. plan, and clearer accountability for compliance.</p>				
<p>Recommendation 1: Eliminate institutional constraints to air quality improvement.</p>				
<p>Objective A: Negotiate with U.S. EPA to address federal constraints on alternative compliance emission reduction programs.</p>				
SJVAPCD and ARB to conclude negotiations with EPA to provide more District latitude for alternative compliance programs. Initiate implementation.	Ongoing.	Ongoing.	Ongoing.	SJVAPCD, ARB, US EPA.
<p>Objective B: Negotiate with U.S. EPA allowance of SIP credits for incentive programs.</p>				
SJVAPCD to obtain approval for incorporation of incentive-based programs in SIP.	Ongoing.	Ongoing.	Ongoing.	SJVAPCD, ARB, EPA.
<p>Objective C: Work with ARB to identify appropriate criteria for incentive programs in the Valley.</p>				
SJVAPCD and ARB to conclude negotiations to enable effective implementation of incentive-based programs described in Recommendation 3.	Ongoing.	Ongoing.	Ongoing.	SJVAPCD, ARB.
<p>Recommendation 2: Encourage EPA adoption of tighter federal emission control standards.</p>				
<p>Objective A: Recommend that ARB work with U.S. EPA to ensure that On- and Off-Road Heavy Duty Vehicles and equipment comply with applicable new and in-use emission standards.</p>				
ARB and EPA to re-evaluate process for determination of in-use emission rates of vehicles and equipment to ensure emissions are within expected range.	Ongoing.	Ongoing.	Ongoing.	ARB, EPA.

Objective B: Encourage U.S. EPA to develop the strongest emission control standards for locomotives. Negotiate with railroads to ensure early introduction of the cleanest locomotives into the San Joaquin Valley fleet.				
U.S. EPA adopt and apply Tier 3 locomotive standards.	Tier 3 locomotives not yet available. Negotiate Tier 3 adoption schedule with railroads.	Replace 10% of fleet per year with Tier 3 locomotives.	40% Of older locomotives replaced. Minimum 7 tons/day emission reductions by 2015.	ARB, SJVAPCD.
Recommendation 3: Implement incentive mechanisms to accelerate adoption of air quality mitigation technologies.				
Objective A: Establish Air Quality Mitigation Zones (State level designation).				
Establish and fund a San Joaquin Valley Air Quality Mitigation Zone to accelerate adoption of stationary source emissions reduction technology and encourage investment in clean energy and alternative fuels. Target funding: \$50 million/year.	Incentive benefits begin to flow to investors.	Evaluate results and adjust program as needed.		Valley State Legislators.
Objective B: Establish Air Quality Empowerment Zone (Federal level designation).				
Establish and fund a San Joaquin Valley Air Quality Empowerment Zone to accelerate adoption of stationary source emissions reduction technology and encourage investment in clean energy and alternative fuels. Target funding: \$100 million/year.	Incentive benefits begin to flow to investors.	Evaluate results and adjust programs as needed.		Valley Federal Delegation.
Objective C: Establish and fund a 5-year program to scrap and replace approximately 6,000 gross polluting passenger vehicles per year and achieve 20 tons/day emissions reduction over 5 years.				
Define program parameters. Secure funding. Initiate program. (Target funding: \$24 million/year).		Evaluate pilot and determine continuation, amendment or termination.		Valley State & Federal legislators, Cal/EPA, ARB, SJVAPCD.
Objective D: Establish and fund a 5-year program to scrap and replace approximately 7,500 heavy duty diesel trucks per year and achieve 60 tons/day emissions reduction over 5 years.				
Define program parameters. Secure funding. Initiate program. (Target funding: \$300 million/year)		Evaluate pilot and determine continuation, amendment or termination.		Valley State & Federal legislators, Cal/EPA, ARB, SJVAPCD
Objective E: Establish and fund a 5-year scrap and replace program for off-road equipment to achieve 10 tons/day emissions reduction over 5 years.				
Define program parameters. Secure funding. Initiate program. (Target funding: \$50 million/year)		Evaluate pilot and determine continuation, amendment or termination.		Valley state & federal legislators, Cal/EPA, ARB, SJVAPCD

Objective F: School Bus Fleet Modernization.				
SJVAPCD to administer program after infrastructure bond passes.	Evaluate need for additional funds and secure same if needed.	Average school bus age is at or below the CA average.		ARB, SJVAPCD, School Districts
Recommendation 4: Promote Clean Energy Projects.				
Objective A: Establish a San Joaquin Valley Clean Energy Office.				
Launch the office. Begin work on demonstration projects and technical assistance.	Continue technical assistance and demonstration projects. Raise PUC Public Benefit Funds to minimum 100% of contributions.	Full-scale implementation.	Ongoing.	Local NGO, CPUC, CA Resources Agency.
Objective B: Establish San Joaquin Valley Clean Vehical Information Exchange.				
Secure seed funding and launch the Exchange.		SJVCVIE becomes self-funding.		Local NGO, Valley Federal delegation, SJVAPCD.
Objective C: Implement Community Choice Aggregation Project.				
Launch operation.	Ongoing. 20% of new electrical generation from lower emissions renewable sources.	Ongoing.	Ongoing.	Kings River Conservation District, Valley state legislators, Governor, CPUC.
Objective D: Net metering within same agricultural operation or water district.				
Introduce and Pass State legislation. Initiate program.	Ongoing.	Ongoing.	Ongoing.	Agricultural Industry, Valley state legislators, CPUC.
Objective E: Incentivize use of agricultural biomass for fuel and energy production.				
USDA, SJVAPCD, ARB, CEC, PUC and agriculture stakeholders develop program guidelines.	Initiate program implmentation.	Ongoing.	Ongoing.	USDA, SJVAPCD, ARB, CEC, PUC, and agriculture stakeholders.
Recommendation 5: Improve People and Goods Movement.				
Objective A: Evaluate Highway Tolling Option (joint recommendation with Transportation Work Group).				
Initiate technical evaluation and conduct stakeholder focus groups.	Public education of options and recommendations. If feasible, initiate project design and construction.	Complete project construction.	Ongoing.	COGs, CalTrans, FHWA.
Objective B: Urban Traffic Synchronization Pilot.				
Secure funding and initiate pilot.		Evaluate pilot and decide next steps.		COGs, CalTrans, SJVAPCD, ARB.
Objective C: Evaluate/Implement Short Sea Shipping.				
<i>See Transportation Work Group Recommendations.</i>				
Objective D: Evaluate/Implement Multi-modal Facilities.				
<i>See Transportation Work Group Recommendations.</i>				
Objective E: Evaluate/Implement mass transit options.				
<i>See Transportation Work Group Recommendations.</i>				

Recommendation 6: Encourage "Green" Local Government.				
Objective A: Accelerate Use of Clean Energy Technologies in Municipal and State Operations.				
Moyer guidelines modified by ARB. SJVAPCD implements new guidelines.	Ongoing.	Ongoing.	Ongoing.	Local governments, Governor, ARB, SJVAPCD.
Objective B: Include Air Quality Scoring Criteria in all Municipal and State Procurement Contracts.				
Council of Governments to encourage all local governments. Cal/EPA to encourage State agencies.	Monitor use of scoring criteria and collect data on emission reductions.	Ongoing.	Ongoing.	COGS, Local governments, Governor, SJVAPCD.
Objective C: Adopt Green Building Standards.				
<i>See Land Use, Housing and Agriculture Work Group Recommendations (Blueprint project).</i>				
Objective D: Adopt New Land Use Guidelines.				
<i>See Land Use, Housing and Agriculture Work Group Recommendations (Blueprint project).</i>				
Recommendation 7: Accelerate Research of Critical Emissions.				
Objective A: Agricultural PM10, PM2.5 and ROG Emissions Research.				
Evaluate needs, set priorities and secure funding. Initiate research.	Continue research and development of emission reduction strategies. Initiate implementation.	Continue implementation.		Agricultural Industry, SJVAPCD, ARB.
Objective B: Research of Dairy Emissions Sources and Best Available Control Technology (BACT).				
Secure funding. Initiate research and BACT demonstration projects. (Target funding: \$37.5 million)	Continue research. Conduct demonstration projects, and initiate BACT implementation where appropriate.	Initiate widespread implementation of BACT		SJVAPCD. Dairy Industry, Federal Legislators.
Recommendation 8: Improve Public Understanding of Air Quality Issues and Solutions.				
Objective A: Conduct Public Education Campaign.				
Evaluate best practices for public education. Conduct and analyze baseline survey.	Determine campaign strategies, messages and messengers. Initiate public education campaign.	Evaluate campaign results and determine next steps.		SJVAPCD, ARB, public interest organizations, public sector institutions, private sector.
Objective B: Publish and distribute "user-friendly" Air Quality Improvement Plan and Annual Progress Report.				
Publish user-friendly SJV Air Quality Plan, including SIP plan highlights and Partnership recommendations.	Issue annual progress report.	Ongoing.	Ongoing.	SJVAPCD, ARB.

IV. Resources for Implementation

As indicated earlier, it is estimated that compliance with the federal 8-hr ozone standard by 2013 will require public and private sector in excess of \$10 billion. The Air Resources Board has estimated that the public sector investment to remove one ton per year of ozone precursors is on the order of \$25 million. Given other constraints, it is not clear that 2013 standards can be achieved even if this level of public sector investment is available. A final determination on this question is not possible until the District has completed its SIP. What is clear, however, is that major new or expanded incentive programs are needed in order to attain the standards as soon as possible.

The recommendations of the Work Group include three significant 5-year pilot incentive programs for accelerated scrap and replacement of gross polluting passenger vehicles, heavy duty trucks and heavy duty off-road equipment. Together, implementation of these programs will require funding of \$374 million/year. This level of investment is expected to generate approximately 90 tons/day in emissions reductions over 5 years, up significantly from the 7.5 tons/day of emissions reductions being generated by existing incentive programs, but is still likely to be insufficient for achievement of EPA standards on the mandated dates. The level of investment may need to be revisited after the District completes the SIP. It is important to note that this proposed investment by the public sector will be more than matched by the private sector. For example, the heavy duty truck fleet modernization program, the largest of the proposed incentive programs, anticipates that 60% to 75% of the required investment would be made by the private sector. This will require a substantial redirection of private funds to support the Valley's clean air goals.

Additionally, \$150 million/year will be required to implement the proposed Air Quality Mitigation Zone (\$50M/year) and Air Quality Empowerment Zone (\$100M/year). It is estimated that the programs would generate incremental emission reductions on the order 30 tons/day over a 5 year period. The other proposed recommendations can be implemented with a budget of about \$25 million/year. Rounding off, the total funding proposed by the Air Quality Work Group to implement its recommendations is \$550 million per year.

The Air Quality Work group proposes that implementation funding be obtained from the following sources, and recommends appointment of a task force to secure the funding.

- The Federal Government
- State Government
- State Infrastructure Bond (Trade Corridors emissions reduction funds)
- The Farm Bill
- Expansion of existing Air District programs
- Expansion of the Carl Moyer Program
- Proceeds from possible toll road facilities
- Local self-help measures

V. Status Report

See Section III.A. for status of overall goals.